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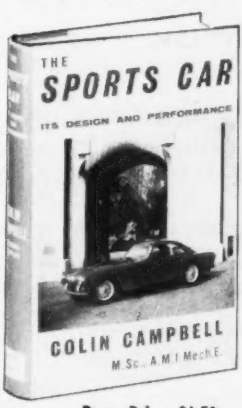


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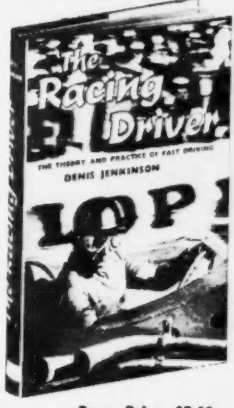


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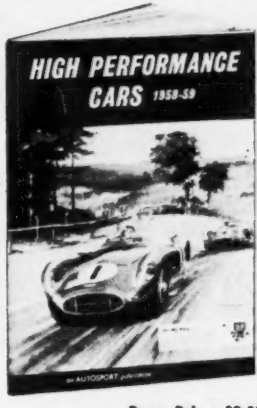
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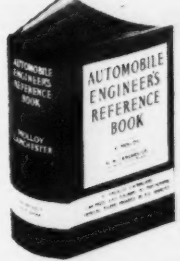
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JANUARY 1960  
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This month's cover was taken outside the BOCAR factory and shows quite clearly how the supercharger is mounted on the gleaming Chevrolet-based XP-6 power plant.



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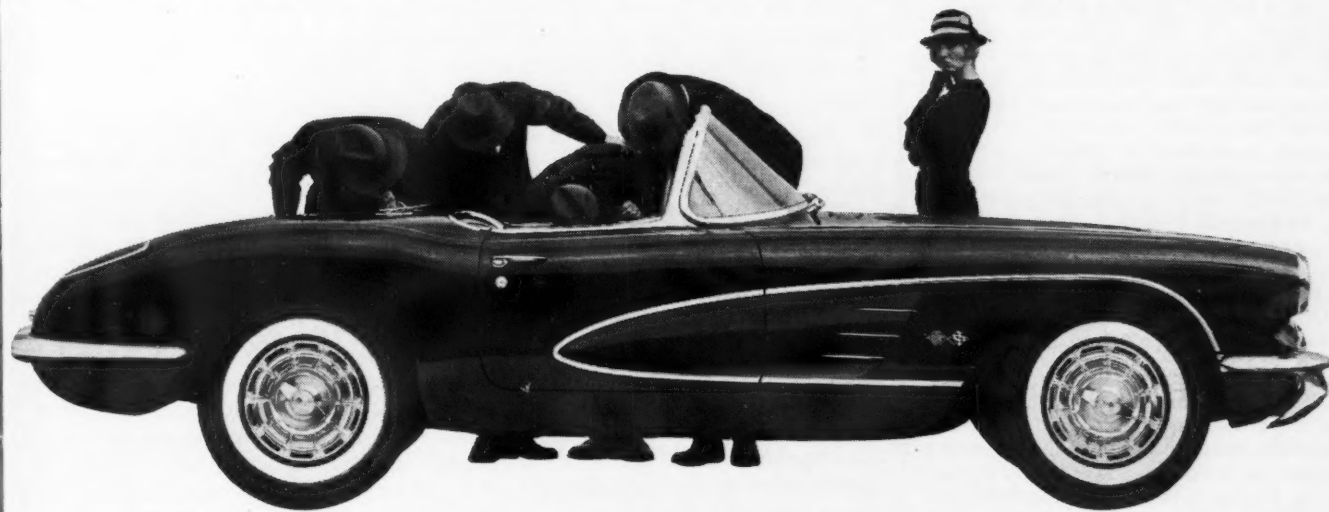
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There are some really remarkable results hidden under modest-sounding specification changes in the 1960 Corvette. For example . . . **Suspension:** A stabilizer bar has been added at the rear . . . and rear spring rebound travel has been increased one inch. Result: every Corvette now has a more supple "boulevard" ride . . . but every Corvette will corner flatter, stick better and definitely outhandle any Corvette offered before, even those with the 1959 heavy-duty suspension option. **Engines:** The two Fuel Injection versions\* now come with aluminum alloy cylinder heads—and they don't use inserted valve seats or guides. This is a major breakthrough in design and metallurgy:

durability of the valve seats is better than cast iron, heat transfer is far faster. Cylinder head and breathing refinements add 25 more horsepower; compression ratio is now 11 to 1. For '60 there's a weight-paring aluminum bell housing for all manual shift models; on the F.I. competition engine this, plus a new all-aluminum cross-flow radiator and the aluminum heads, shaves 80 pounds of weight. **Brakes:** Advances in the optional sintered-metallic brakes enable them to cope with the most severe heavy-duty service while giving a perfectly docile brake for street use. **Summary:** The 1960 achievement in suspension puts Corvette in a class occupied by virtually no other sports car, com-

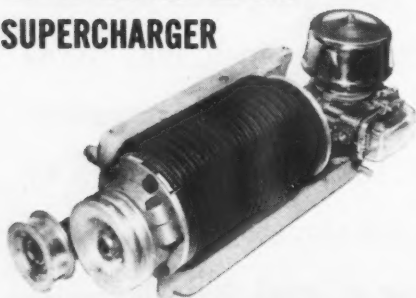
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## OBSERVATION AND OPINION

► Last month's SCI was a bona fide bonus issue, packing in an extra dollop of all the things we think are important in our magazine. This month there's a more subtle bonus to be distributed: an SCI suffused with some of the most readable, thought-provoking and entertaining tales we have ever assembled between covers.

First in line is yet another departure from the crash pad and safety belt school of traffic safety discussion. Penetrating without being pseudo-technical, our learned contributor has gone to the very source of the accident—stopping it literally before it is born in the driver's mind. Fundamental though the subject is, you'll find the conclusions entirely novel.

By superhuman effort Mickey Thompson has elevated the prestige of the hot-rodding fraternity and of American automotive design in general by his near-successful attempts to bring the World Land Speed Record to this country. In a rare story that will stand as *the* record of this epic attempt, Griff Borgeson brings you the first-hand technical details of Challenger I plus the heart-stopping drama that accompanied her runs.

It's glamorous to be listed in the record books but the task of racking up long-distance figures in a highly-stressed small-displacement machine is nerve-wracking to those both inside and outside the cramped cockpit. Eternity began at dawn for the crew of BMC's Austin-Healey Sprite record-breaker, which is when John Christy arose to tell us how and why they succeeded and, sometimes, failed.

January, the month of the Monte Carlo Rally, is perfect timing for Dennis May's always informative and usually hilarious tales of Rallies gone by. Unlike many writers of automotive history Dennis was *there*, to bring back the elusive fact or the priceless anecdote. Where else might you encounter the entry of a 25-posto bus or the machinations of a *superleggera*-brained grade crossing guard?

This country has reason to be deeply proud of the attitudes and abilities of a few young men representing us abroad. By this time Carroll Shelby and Masten Gregory are old hands at European road racing, but their first-string positions on the Aston Martin and Cooper teams are signal honors that show that their talents are real and recognized. Phil Hill had been booted around the Scuderia Ferrari for years until he was "discovered" in the Italian G.P. at the end of '58, and has since acted as the backbone of the Ferrari Grand Prix attack. But during 1959 all these achievements were overshadowed by the meteoric rise and enthusiastic continental reception of Dan Gurney. Youthful, modest and personable, Dan couldn't be more American if he tried—which he wouldn't, anyway. Countless times last year, in the heat of wheel-to-wheel racing with the best Grand Prix drivers, it has been obvious to all onlookers that Dan drives for the sheer fun of driving. We can't delve into his motivations here, but if ever anyone got a kick out of going brutally fast in a fine automobile it is D. Gurney. Like other great or near-great drivers, he makes the car go fast in spite of mechanical difficulties, real or imagined, and brings 'em to the finish too. And when he crosses the line, goggles up, his lantern-jawed visage is riven by a broad grin. Here is a man who enjoys his work.

When Dan returned to the States for Riverside he could have had any Ferrari in the country, or any car for that matter, but from sincere gratitude for past kindnesses he chose Frank Arciero's battle-weary 4.9. (Since he set second-fastest time in practice he must have remembered that the old warrior was quick around Riverside, though!) It was thus all the more ironic that Dan was involved in a starting-grid smashup in the stalled 4.9. I know I'm not alone in wishing him impeccable luck for the future.

Speaking of pride, SCI isn't going to be bashful about its part in the return of two front-drive Miller 91's to their birthplace and, we hope, to eventual running condition. In relation to its time and purpose no better racing car has ever been built in this country. Few cars of any type have ever looked so beautifully suited to moving fast. This month "Project Time Machine" outlines the history of the cars and how they came home. Next in line will be a comprehensive technical analysis, which will be followed by a study of the task of restoration. We think you'll be as excited about the whole thing as we are.

Karl E. Ludvigsen





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8/SPORTS CARS ILLUSTRATED/JANUARY 1960

## EUROPEAN NEWSLETTER

► It has already been written that this is a vintage year for the British Industry. This is made true not only by the advent of such radically fresh models as the Triumph Herald and the British Motors Corporation ADO 15 (Mini-Minor or Austin 7), which have broken away so sensationally from British orthodoxy, but also by reason of the falling-into-line with the better Continental makes which is taking place. A case in point is the Sunbeam Rapier. With remarkably little acclaim from the British Press, Rootes have cleared up all those points which made this model less interesting to the enthusiast than it might have been. Those of us who have witnessed the incredible toughness of this car in the classic rallies have never doubted the solidity of the Rapier, but its attraction as a high speed touring saloon for the ordinary enthusiast has been marred by the lack of a good third gear and deficient power in the higher revolution ranges.

Now, all of this has been put right. A new cylinder head, blood brother to that which graces the Alpine, featuring inclined valves and cast in aluminum, produces 78 bhp at 5400 rpm, sufficient to propel this 2250 lb. coupe at near 100 mph speeds. The makers discreetly disclaim the magic figure. In the gear department the Alpine's four speed box has also been inherited, meaning that 70 mph will be possible in third, an important feature on the traffic-bound roads of Europe. With the optional overdrive on third and top even more performance possibilities are offered in the intermediates. With all of this extra performance available, the factory has wisely looked ahead and added disc brakes to the specification, the popular disc and drum combination by Lockheed this time. I would personally forecast that the Rapier will now become a strong rival to the Volvo Amazon on many markets. In this country the price is, of course, more than \$1000 less. Elsewhere it should be about the same.

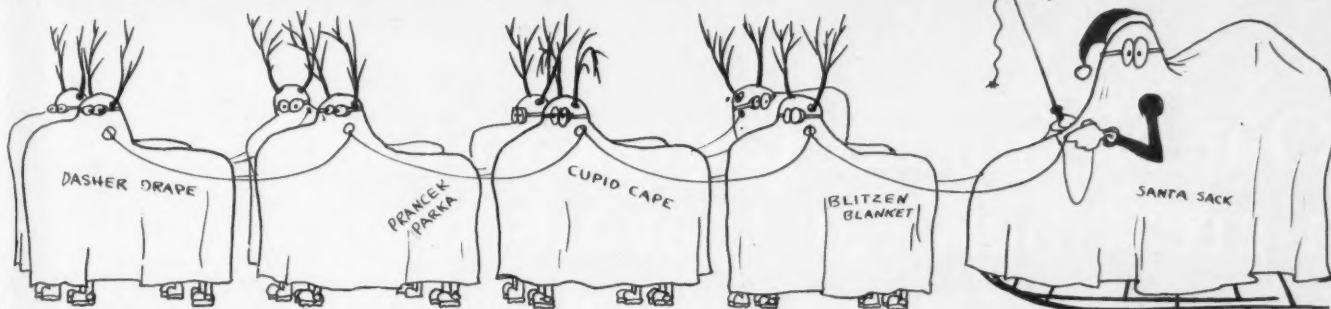
With the simplification of their P4 range, involving the replacement of the 65, 75, 90 and 105 models by the 80 and 100 series, the Rover Company of Solihull would appear to be sitting back on their heels. In fact the development section has never been busier, for it is patent that the aforementioned P4 model could not continue for ever, good as it is. Conjectures as to the form of the new model vary between a forward engined V6 and a rear-engined 1½ litre. Something between the two would be more likely. What is plain for all to see is the progress of the turbine car. Only fuel consumption is the outstanding problem and that is probably the best being obtained today. The car itself has reached the stage where casual use for weekend transport by the project engineer is not unheard of.

By the time these words appear in print Britain will have its first motorway operative. Starting from St. Alban's, just north of London and finishing a few miles from Coventry, it will give to the native motorist who has not travelled abroad his first taste of continued-speed motoring.

(Continued on page 72)



LIKE DON'T JUST SIT THERE STARING, ORDER SOMETHING...

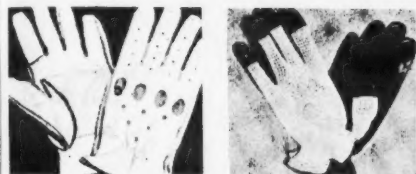


How can I make the scene at your pad with good car things if you don't cooperate... mail in the coupon at once and Marion will take care of all.

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This is the easiest way out... lay a good Gift Certificate (in any amount from \$1.50 up) on your friends. Marion will send them out air mail, along with catalogs, from which they can select the gift most appealing to their senses. No muss, no fuss. Everybody is happy. Just send money plus names and addresses of those you want to remember.



If you know, for instance, that he or she can use gloves, I don't think you can go wrong by ordering either **GRAND PRIX** (all capeskin) at \$7.95 pr. (sizes 6½-10, natural or black) or **LES LESTON** (cape palm, knit back) at \$6.50 pr. (sizes 7-10, tan only).



To avoid snow blindness or sun glare, I recommend **MINISHADES** with their metal rims, ground lenses and flip-up extra shades, they are top quality and offer double protection. Carrying case is about the size of a cigar. Reasonable at \$2.95



Just so you will be sure to remember what kind of a car you drive, why not dazzle yourself with a real leather **KEY FOB**? Topped by a colorful replica of the emblem on your car's grille, these expensive-feeling fobs are quite reasonable. Only \$1.50... and we have one for nearly every current auto. Try us.

If you know, however, that he (or she) drives a **RENAULT, PORSCHE, VOLKSWAGEN, JAGUAR 2.4, 3.4** or **MORRIS**, spring for a **GEAR SHIFT EXTENSION**. 4" long 40° bend.....\$1.35

**SPEEDBALL SHIFT KNOB** (for any car) 1½" or 1¾" dia. Bright silicone finish.....\$2.25

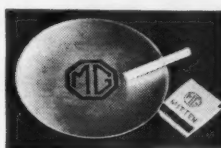
**CHROMED ALUMINUM KNOB**, light but bright.....\$3.25  
**MG SHIFT KNOB** polished aluminum with MG insignia. \$2.25

**SPECIAL RENAULT EXT. & KNOB** of polished aluminum & plastic, makes gear changing possible for human species.....\$2.25

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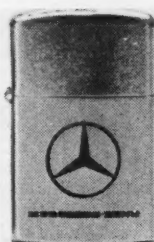


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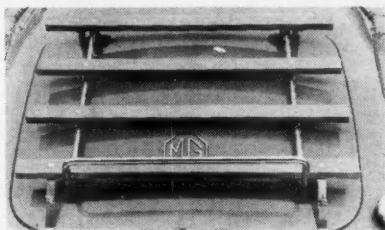
**INSIGNIA TIE TACK** \$2.95

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**LUGGAGE RACKS**, on the other hand, are a sneaky present. (Enables YOU to take more luggage). Special Xmas prices prevail on these high quality racks: Regularly \$21.95 and \$24.95

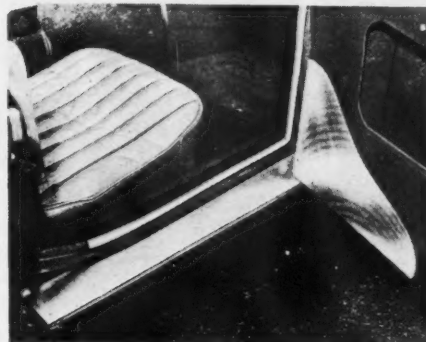
**ALL METAL RACK**, removable, fits MGA, Healey, TR-3.....\$19.95

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<input type="checkbox"/> Fiat Frock (1100TV)		

<input type="checkbox"/> Morris Muff	} \$22.95	} \$29.50
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<input type="checkbox"/> Porsche Parka		
<input type="checkbox"/> Peugeot Pegnair		
<input type="checkbox"/> Minx Muff		
<input type="checkbox"/> Fiat Frock (600)	} \$27.95	} \$32.50
<input type="checkbox"/> Saab Sack		

<input type="checkbox"/> Corvette Cap	} \$22.95	} \$29.50
<input type="checkbox"/> Thunderbird Teepee		
<input type="checkbox"/> Jaguar Jacket (140, 150, 3.4)		
<input type="checkbox"/> Mercedes Muff (190, 300 SL)		
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Maximum speed .....	100 m.p.h.
Compression .....	9.2:1
Displacement .....	1,494 c.c.
Cylinders .....	4
B.H.P. ....	83.5 @ 5,300 r.p.m.
Wheelbase .....	86 in.
Overall length .....	155.25 in.
Overall width .....	60.5 in.
Overall height .....	51.5 in.
Ground clearance .....	5½ in.
Turning circle .....	34 ft.
Weight—dry .....	2082 lbs.
Twin Zenith downdraft carburetors, inclined overhead valves, wedge-shaped combustion chambers, aluminum cylinder head for higher thermal efficiency, special cross-flow radiator with separate expansion tank.	
Transmission (Synchromesh on top 3 speeds) 4 close-ratio forward speeds, center floor gear shift.	
Rear axle .....	Hypoid 3.9:1
Brakes, front .....	Girling 9.5" disc
Brakes, rear .....	9.0" drum
Suspension, front..Independent coil springs, anti-roll bar	
Suspension, rear .....	
Semi-elliptic with telescopic hydraulic shock absorbers	
Chassis .....	
X-braced single unit construction. Torsion-bar sway eliminator	
Electric .....	
12-volt. Battery housed under rear seat to balance between axle mass and reduce evaporation	
Lubrication .....	
Full pressure, full-flow filter	
Fully instrumented dashboard—including tachometer, pressed steel disc wheels (wire wheels extra), center armrest conceals large lockable glove box, concealed retractable top (or hardtop—available as extra), wrap-around bumpers with overriders, large luggage compartment.	



## LETTERS

ASARDO

### CORVAIR

I was mighty disappointed about your analysis of the Corvair. How can you accept low torque at the steering wheel — at the expense of slow steering — as good steering? This is both awkward and unsafe. With such a light front end why did Ed Cole use Detroit steering? It's dishonest for it is only required by big cars with heavy eight-cylinder motors. As to learning new techniques, about 200,000 foreign cars have been imported in the last few years, all of them operated by drivers who also graduated from Detroit cars without trouble.

My DKW takes a city street turn on the inside with a half-turn of the wheel. In my test ride in the Corvair I was horrified to see the driver spin the wheel "x" revolutions to turn a corner on the *outside* lane. Gad!

Although I have always disliked gasoline fired heaters in water-cooled cars, when all this waste heat was available, I particularly like the gas fired heater in the Corvair, because it keeps both the noise and fumes out of the cab.

If Ed Cole will put out a real sports model Corvair, at not more than around \$500 over the standard models, you can place my order with him right now. This car would resemble the Porsche in function: a two-door coupe, with bucket seats for two, and a drop—or mother-in-law seat in the back. Snappy steering, and a four-speed transmission with a short stick are also essential.

Henry Eckhardt  
Fair Oaks, Cal.

We must first emphasize that the driving impressions of the Corvair included in the November analysis were just that, and were not intended to be SCL's last word on the road behavior of the car. With about 4½ turns to cover a not-exceptional steering lock, the Corvair's overall ratio is on the slow side. When you're behind the wheel, though, the car's wonderful response to its motions leaves little to be desired. G.M. may have been sufficiently apprehensive about the car's oversteer to avoid faster ratios for the time being. We agree, though, that the Corvair could bear quicker steering and that the sports version, definitely due early in 1960, must have it. That's one we're really looking forward to driving.

### FORMULA CAR SALE

At the present time I have a list of nine Formula III cars which are for sale east of the Mississippi. They are priced from \$1000 to a tad over \$3000. All sales must be negotiated with the owners — this list is strictly a non-profit effort. Should any of your readers desire a copy of this list (and all subsequent ones) have them drop me a line.

William H. McMichael  
4106 Waxford Drive  
Kensington, Maryland

In our October issue we printed a technical report on the Asardo in which we gave a description of the Reinforced Plastic body used on this car. We received a letter soon after, the pertinent paragraphs of which are printed below. The writer's name has been withheld by request.

Being closely associated with the Fiberglass and Resin business, and R/P manufacturers for several years, I visualized the possibility of several fiberglass people, (perhaps some of our customers) becoming confused, with expensive consequence, as a result of taking parts of the referenced article as gospel.

Refer Pg. 55, para. #6 "... after the parting agent is applied ... etc."

Actually this method of applying a clear polyester instead of a Gel-Kote is almost passé. Presently nearly every manufacturer of large, low pressure R/P lay-ups sprays a translucent or colored Gel-Kote over the parting agent(s), applies dry glass cloth or mat over the slightly tacky, cured surface, wets it out, continues the lay-up, and is able to remove the cured part from the Female mold with NO SANDING. (Provided the mold surface is reasonably good.) We realize K.L. was only reporting one company's procedure, but;

Para. #7 continues; "... to ease removal of bubbles ... etc."

We must assume the viscosity of the resin used was too heavy, or the catalyst ratio was too high to enable the removal of the entrapped air before the resin cured, thus the addition of styrene as a thinner. Resin viscosity range popularly falls between 300 and 500 centipoises at 25 deg. C. (for molding). Ordinarily NO styrene should be added to a resin! Excess styrene causes: slower cure, more exothermic heat, more shrink, and resultant warpage, more resin run-off, and subtracts from the potential strength of the resin. Manufacturers of resins add approx. 20 to 30 percent by weight during processing. This is very adequate for a workable viscosity resin. Acetone is a SOLVENT for polyesters, and NEVER should be used as a thinner when molding!

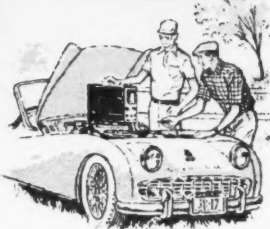
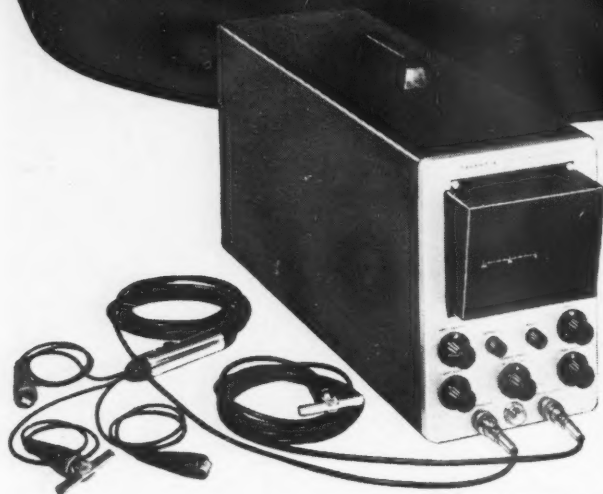
Then Para. #12; "... through rigid mounting of the body ... etc."

Undoubtedly Mr. Schlosser has developed an extremely rigid space frame, otherwise it would only put added torsional stresses on an R/P body to have it rigidly mounted. In the original Corvette, they found it advisable to mount firmly around the cockpit area only, with minimal mounting front and rear. Here again, I am visualizing some of your many subscribers who may attempt a mounting without benefit of Mr. Schlosser's space frame, but perhaps with some of our plastic materials.

Finally; caption, picture pg. 59; "... wood frame is necessary to keep 'drying' plastic ... etc."

The purpose of the framing should be to keep the female mold rigid and to prevent its warpage during continued use. Many such molds are used in continual operation for 6 to 9 months. It is currently becoming more popular to use a higher heat resistant polyester resin for the heavy lay-up of female molds to prevent heat

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warpage. (The exothermic heat of the curing part within the mold, depending on the resin/glass ratio, can approach 185 deg. F.) Mr. Schlossers' fiberglass man would find it more convenient to design a cradle for his large molds, so they could be tilted for easier lay-up and less run off of resin.

Please do not consider my lengthy comments in any way derogatory. The field of Reinforced Plastics is perhaps one of the most misunderstood there is.

Our correspondent's informed comments are much appreciated. Mr. Schlosser would be the first to admit that his prototype was not laid up in accord with methods that would be better suited to quantity production. With regard to the caption on p. 59, its text was in error. The wooden framing was clearly intended to impart rigidity to the female mold. For an example of a cradle to support such a mold, see the Bocar story in this issue.

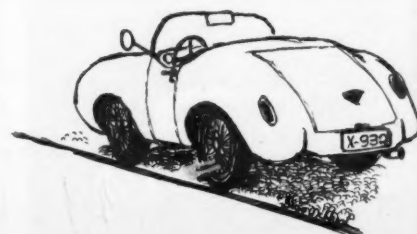
## SOUND OFF

I debated with myself for sometime before deciding to extend my subscription for three years as per the enclosed "renewal reservation" and check for \$10.00.

My hesitation was not based on a lack of appreciation for your publication because I am 100 percent enthusiastic about it. Nevertheless I did hesitate since a three-year renewal will deprive me of a yearly opportunity to write you and concurrently exercise my "Joe Blow's Right" to praise, squawk, berate, or exhort you annually. Therefore, since I've taken the three-year route I'll get all out now and:

1. *Praise* the overall make-up and contents of each of your issues;
2. *Squawk* only when I'm absolutely certain I'm right and your editors have definitely missed the boat (and never just because said editors don't agree with my thinking);
3. *Berate* those who go off half-cocked and violate the premise set forth above under "2", and
4. *Exhort* your feature writers and race editors for greater detail and more specific coverage of the activities of the drivers and cars who are not generally in the "name" class. In other words:
  - (a) Lew Spencer and Morgans and AC's rather than Hyphenated Smith Smythe
  - (b) Ken Miles and Porsches rather than Gesundheit Hansenfeller
  - (c) Bob Bondurant and Corvettes rather than Ferrari Volanto Fortissimo

John F. Holton  
Los Angeles, Calif.







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# DETROIT NEWSLETTER

by Mike Davis

► Usually alert Detroit found itself caught off base by the announcement that for "the spring selling season" Mercury dealers would offer another Ford "economy" car, named Comet.

When the feathers and stardust settled, it turned out the Comet and the "Edsel B" the grapevine has been gossiping about all along are one and the same. (Ford engineers employed Edsel B as a smoke-screen just as XK Thunderbird was the Falcon.) Further, the Comet—which will bow in late February—is an elongated Falcon rather than the completely new model anticipated from Ford's M-E-L (Mercury-Edsel-Lincoln) Division.

At this writing, here are the known facts about Comet:

- Wheelbase, 114 inches (four and a half more than Falcon).
- Width, 70 inches (same as Falcon).
- Body styles—two door, four door and wagon.

Engine of the Comet appears to be the same as in the Falcon, but probably has a longer stroke. It would also be possible to offer the large 145 hp Ford six. Grille is similar to the Falcon in outline but has dual headlights and vertical strips like the 1960 Mercury. Rear end treatment is more like the Valiant than the Falcon and the greenhouse, T-bird-like.

The Comet has been described as "aristocrat of the economy cars," but this does not mean it will be comparable to a Thunderbird. More likely, it will be priced between the Falcon and the regular Ford. The 1961 Continental is M-E-L's next compact car in the offing, believe it or not. Prototypes have been described as shorter than the Mercury, with thin fenders and sloping snout like the 1960 Ford, a Thunderbird roofline. One model being considered is a four-door convertible.

Comet will have more exterior trim, more luxurious interiors and more luggage space than the Falcon. Overall length will be about one foot longer. With longer wheelbase and more weight, the ride should be better. Handling, which is so good on the Falcon, could be impaired.

Latest report, as yet unconfirmed, is that Chrysler will have a second domestic small car available some time next year, to be offered by the Dodge dealers. Presumably it would be a beefed up Valiant. The Plymouth-sized Dodge Dart is being sold by many dealers—at a good pace, too—as a small car.

## THE BUICK-OLDSMOBILE-PONTIAC SMALL CAR

Ford's plans to bring out the Comet in mid-winter have caused a flurry at General Motors. Original plans for introduction of the B-O-P car in mid or late summer as a 1961 model are being advanced, tooling and debugging permitting.

Buick has ordered re-tooling of V8 machinery for an aluminum engine, presumably for the big car. But conceivably this could go for "Bop" also. One rumor, for what it is worth, is that Pontiac's version will use a hopped-up Corvair engine.

Anti-freeze corrosion problems and cylinder wall wear are yet to be satisfactorily solved in Detroit's water-cooled aluminum engines.

## DRIVING THE VALIANT

Our first spin in the Valiant was shared by six-foot-four, 250-pound Tom Kleene, of the Detroit Times; six-foot-one, 195-pound Ted Douglas, of the Windsor (Ontario) Star; and six-foot-two, 180-pound Frank Fraser, head of product volume planning on the Plymouth-DeSoto-Valiant engineering staff.

Needless to say, two more passengers of such bulk would have left things a bit crowded. But let's face it, how often do you have a cargo like that?

Testy . . .

The point is, with that load, the straight transmission-equipped V-100 (stripped) model went like the proverbial scared rabbit. We managed 0 to 60 in just over 16 seconds . . . according to Chrysler the car is rated at 18.2, allowing half a second for each gear change (we were faster on the shift).

Slightly tailwinded, we got an indicated 99 on the speedometer . . . the Valiant is rated at 97 mph top. We went up and down hills, around twisting turns and over scalloped roads in a "torture course" on the Chrysler Proving Ground designed to resemble the old black tops you find in some parts of Kentucky.



SCI's Detroit correspondent prior to a test run on the Valiant.

Valiant runs smoothly, tightly and quietly, corners flat, pitches not at all. Steering is simply a delight . . . the steering wheel has a relatively short diameter . . . wide open on the speed course or over the bumps and grinds, one light but firm hand is all that is needed. Only in the most severe sliding turn is slight correction required.

We put an automatic (three-speed) transmission, power steering-equipped V-200 (top of the line) through the same paces, but with less ballast. Surprisingly, the 0-60 is rated faster (16.9 seconds) in the automatic than in the neat, short-throw, floor-mounted stick shift job. With one turn less lock to lock than manual, the power steering is quicker.

We thought the automatic Valiant was noisier at high speed than the stick job, but the engineer riding co-pilot said it shouldn't be. By the same token, on hills it was definitely mushier than the stick, reminiscent of the automatic Falcon—but of course we're a straight transmission fan. The power steering is definitely handy in

parking—though not as much of an aid, relatively speaking, as on the larger cars.

Penny-pincher . . .

Economy of the Valiant quite evidently will run around 30 miles per gallon in careful highway driving. Driven by auto writers, stick Valiants delivered up to 44 miles per gallon at attempted steady 30 mph. This, according to Chrysler engineers, puts it on par with Corvair and slightly below Falcon—with substantially better performance available. Another saving: tire life should be 10 to 25 percent better than on larger cars.

Shipping weight of the V-100 sedan is placed at 2,635 pounds, the V-200 20 pounds more. Chrysler also put a number on horsepower—101 at 4400 rpm, but we were told honest dynamometer is 115 to 118. Apprised of Chevy's plans for a Gran Turismo Corvair, Valiant engineers looked wise and suggested: "Watch Speed Week at Daytona. We've got a few tricks, too." And that's with the same block, too.

Speaking of such, it is probable Valiant will have an aluminum block, weighing 100 pounds less than the cast-iron version, ready for the 1961's.

One other point: Valiant has generous consideration for safety—clean, projectionless instrument panel, deep-dish steering wheel, padding and belts as common options.

## OF PRICES, PLOYS AND PITCHES

Dollars and sense . . .

To those who expected Ford Falcon prices to duplicate nearly Chevrolet's Corvair—as has been the case with the big cars for many years—the markedly lower Falcon prices came as a surprise.

Advertised delivered price of the two-door Falcon, only model made initially, came out to \$1,912, significantly . . . \$126 . . . lower than the cheapest Corvair available. When the two-door Corvair is unveiled in late January, Falcon will still have a price advantage of about \$65.

As expected, American Motors reduced prices on its 100-inch wheelbase American models. The cheapest two-door has an ADP of \$1,795, very little more than the most popular imports in many parts of the U.S. The new four-door American has an ADP of \$1,844. Prices on the 108-inch wheelbase Rambler Six models were unchanged.

The Valiant, happily, is priced only \$14 more than the comparable Corvair four-door sedan. Delivered price is \$2,050 for the V-100. Although this does not compete dollar-wise with the Falcon and Corvair two-door models, Chrysler is pinning its hopes on the Valiant wagon, about \$275 more than the four-door sedan.

## SO WHO CARES WHERE THE ENGINE IS?

When the Corvair and Falcon appeared in dealer showrooms early in October, they were, of course, snapped up immediately by eager, cash-in-hand buyers. What Detroit learned very quickly was that its ad campaigns will have to be reslanted. Few in the general public gave a hoot whether the engine was in the front or rear, contrary to much agitation.



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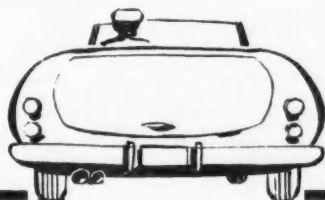


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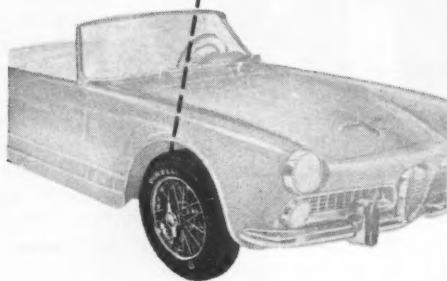
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# SCI INDEX 1959

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A cool car can cop a checker

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The opposite of acceleration most often wins

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I Go Pro.....Denise McCluggage

A thin green line separates amateur from pro

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Der Engländer.....Dennis May

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They sold the name, but not the talent

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Hot drivers don't earn cool cash

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A special builder, and how he grew

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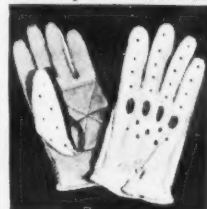
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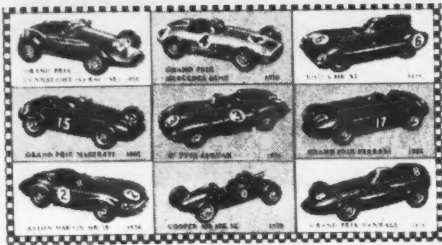
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# SCI INDEX 1959

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A Comet Called Archie.....Donn Munson

A study in determination

Making A Little Package Go A Long Way

Into your little wagon with hammer and saw

What Did You Buy, Trouble?.....Stan Litz

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Fast cars and strong sunshine make for a

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They Said It Couldn't Be Done.....Ocee Ritch

Now we know where that little old lady from

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Many things happen during 24 hours of racing

10th Floor Go Kart.....John Christy

Don't laugh until you try one, and you will

Kourse For Karts

Racing cars need circuits—don't they?

VW Hammer.....Stan Mott

Bug owners to the barricades!

## ROAD TESTS

Chrysler 300 E

Renault Caravelle

NSU Prinz

BMW 600

Singer Series II Convertible

Austin-Healey 3000

## COMPETITION

Grand Prix of Monaco

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Racing Brakes Part II.....Karl Ludvigsen

Continuing study of the axiom "What goes,

must stop"

Skoda Sports.....Jesse L. Alexander

and Donald G. Typond

The Czechs double check their future

competition car

The Borgward RS.....Karl Ludvigsen

Porsche pushers beware, there's something

brewing in Bremen

Play Your Ace.....Dennis May

A well prepared Ace Bristol stacks the deck

in your favor

Raising Spyders At Home.....George Moore

Most home-bred vehicles look it, but this

one doesn't

## FEATURES

Most Expensive Victory.....Frederico Kirbus

Back in the '30s, Mercedes-Benz couldn't

lose for winning

Built To Win—Just Once.....Karl Ludvigsen

The Grande way to go racing—build a car

for each race

Americans At Le Mans.....Hugh McGrillen

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The Downfall Of Amalgamated Pizza

Robert G. Lurie

The Pignatelli runs full bore into

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Argentina Grand Prix Racing.....Vincente Alvarez

Who said that GP cars have never run on this

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When Steam Was Beaten.....Willard C. Poole, Jr.

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Twelve Years With Twelve Cylinders

Stephen F. Wilder

A dozen little pistons and how they grew

The Last Real Ferraris.....Karl Ludvigsen

The Supersqualo was the end of a long line

of pure-bred single seaters

Racing Brakes Part III.....Karl Ludvigsen

Discs bring this arresting tale up to date

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The man, and his cars

Breakfast With Farina.....Griff Borgeson

To build beautiful cars you must have

a beautiful soul

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 Carrera In Competition.....Emil "Pup" Pupilidy  
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It goes as well as it looks

Indianapolis.....George Moore

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Racing Brakes Conclusion.....Karl Ludvigsen

The last word on stopping power

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Tony Brooks—Gentleman Driver

Steve McNamara

Cool, calm and fast—that's Tony Brooks

SCI Club Of The Year—

Midwest Sports Car Club.....Sherrie Zuckert

Our annual pick of the best of the clubs

Formula K is for the Kommon Man.....Ocee Ritch

Don't shove, there's plenty for everyone

Eleventh Hour.....Frederico B. Kirbus

A race is not won until the flag falls

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Mr. Taylor had an Alta ego

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Is there AAA service in the Sudan?

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Anybody can buy a beetle ready made!

Wolfsburg Wildcat

Hile Goodrich & Dick Burnell

Don't tell the boys back in the Fatherland

what we've done

Argentina Grand Prix Racing—Part II

Vincente Alvarez

The fabulous '50s in South American racing

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The TR 3-S At Le Mans

Richard & Harriet Alguin

Triumph's latest almost made the grade on

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Lola

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The biggest of the big three builds a

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First Impressions—1960 Corvette.....Karl Ludvigsen

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Gears Can Make You Go.....Roger Huntington

How to choose the right cog for the job

Mercedes-Benz Builds a New 220.....Jesse Alexander

Can one of the best get better?

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Hark! the Herald owners sing of Triumph's

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The Short Unhappy Life of the Monzetta

Charles Beaumont

There's a little bit of Walter Mitty in

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The Best Car in the World?

David Scott-Moncreif

Could there be any other answer, but yes?

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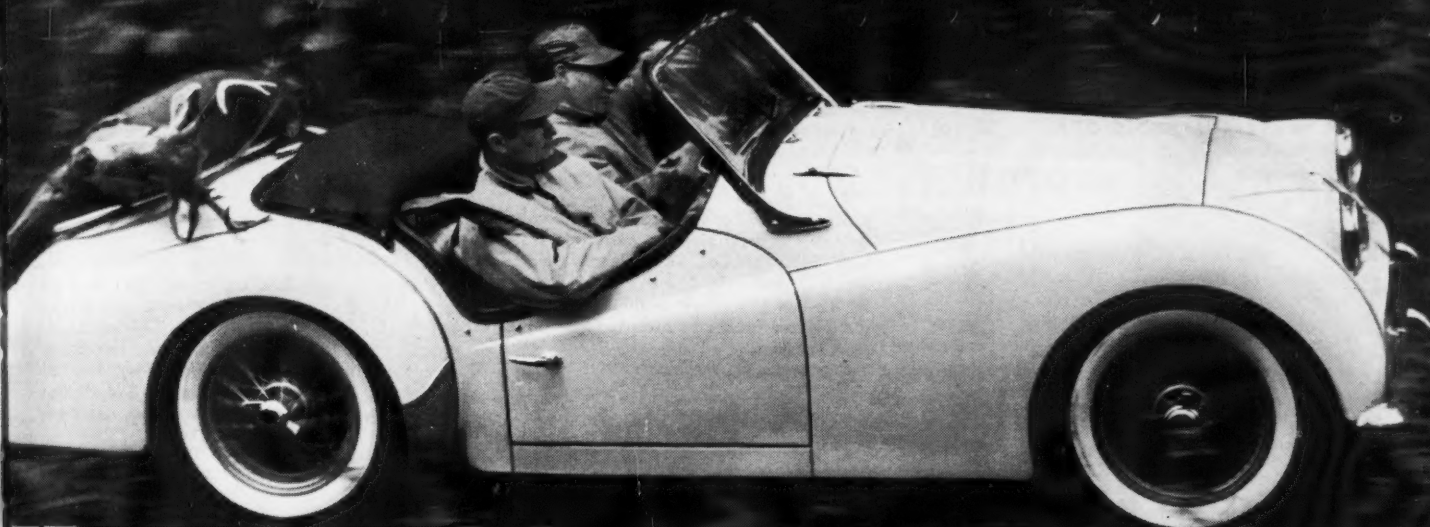
Dic Van der Feen

Tourist Trophy.....Jesse Alexander

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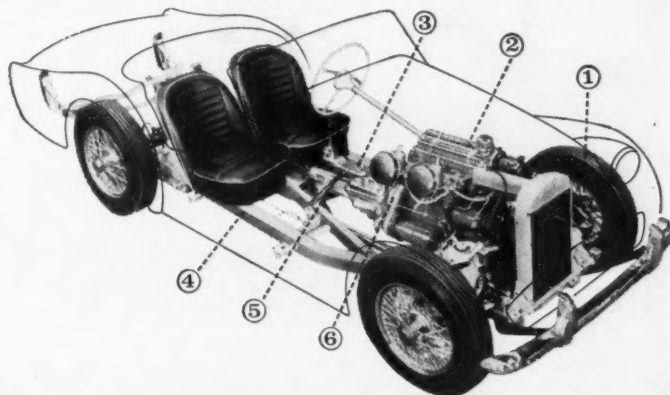
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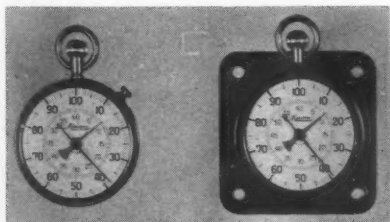
# NEW PRODUCTS



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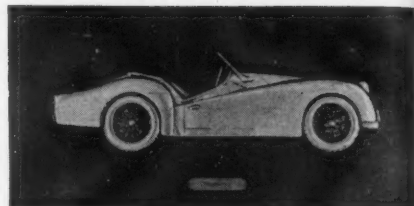
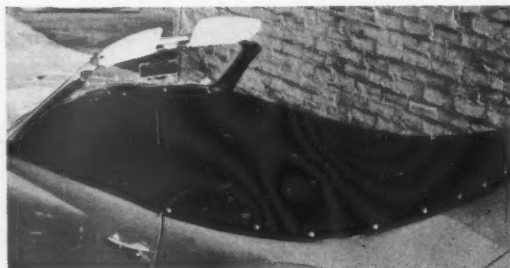


This locking handle will prevent theft of items from the trunk of the Renault Dauphine. Made of aluminum and designed for easy installation, the unit has a tumbler lock and is provided with two keys. \$5.49 from Kal-Kraft, 11030 Chandler, North Hollywood, California.



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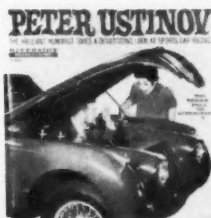


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## THE WILL TO POWER

In our language the verb "to drive" describes the mechanics of guiding an automobile, but also connotes a compelling force that can reside within any man — particularly when he's seated behind the wheel. This superb essay on the psychological impulses behind driving is presented with the permission of the English-language edition of REALITES magazine; it gazes deep into all our minds as we engage in the complex conflicts of highway life. It consolidates what SCI has long believed: the wilful ego seldom gains control if the driver's job holds his interest and provides a worthwhile challenge. **by T. de Quenetain**

► Driving a car is supposed to be a pleasure. In a recent poll, 88 per cent of the persons interviewed agreed to this without any hesitation. But—and this is the least you can say—it is a peculiar form of pleasure.

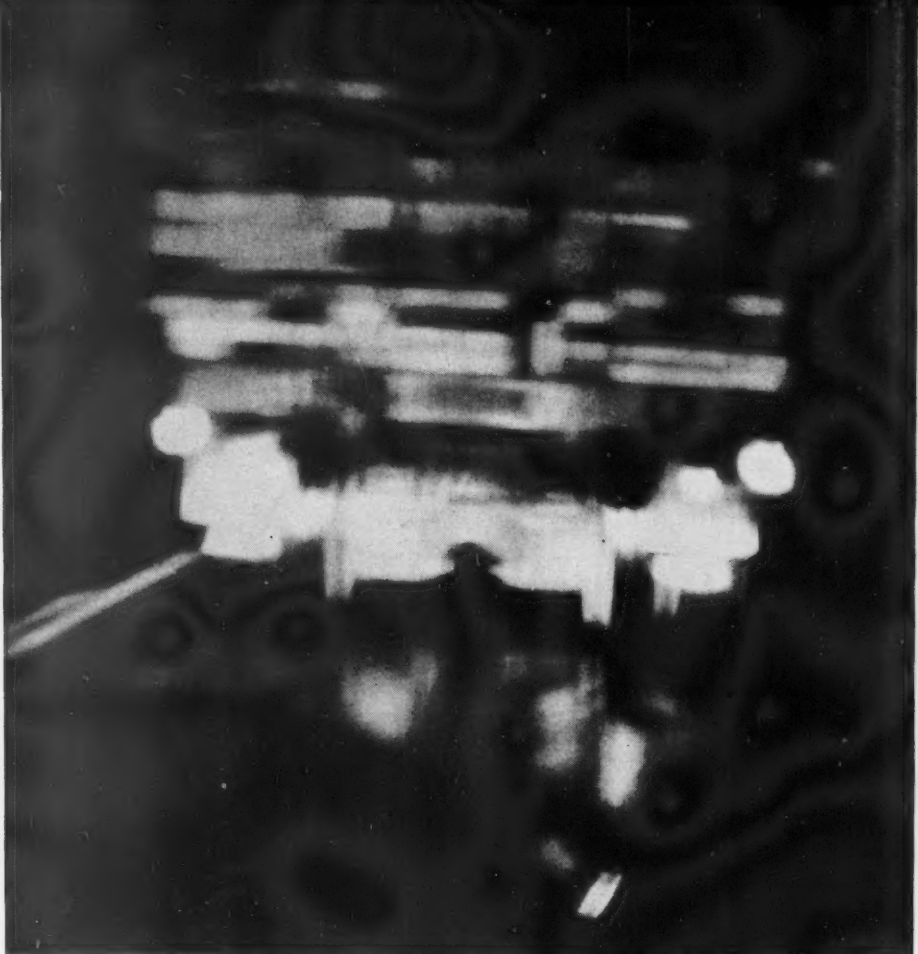
In a great many respects, a car fulfills the same function as that strange drug which the upright Dr. Jekyll absorbed to transform himself into the diabolical Mr. Hyde.

What is there about driving a car that turns a motorist into a Mr. Hyde? Why is his pleasure so easily shattered by this overwhelming exasperation? And, finally, how can you enjoy driving without paying such a heavy price?

The answers to these questions hinge upon three key factors:

1. the nature of the pleasure of driving;
2. the psychological changes that take place in a driver;
3. the results these changes make in the relationship between the driver and the rest of the world.

Driving is pleasure because, first of all, it is a "game"—that is, an activity in which a man can display a varying degree of ability but without having the impression that the result is vital to his life or to his career. Knowing how to weave through city traffic or to take a curve at high speed are tests which are pleasant to pass successfully—but in which there is nothing shameful if you decide not to try them. The same holds true for bridge, tennis or skiing—except in the case of professionals who, of course, no longer regard them as games. But, unlike bridge or tennis, driving a car does not require long apprenticeship nor strenuous physical or intellectual effort. It is neither a difficult game nor a true sport. The exaltation it offers is thus completely out of proportion to what it represents as an exhilarating game.



On the other hand, motoring offers something which only a very few sports—skiing, horseback riding, or outboard racing—can supply to those who practise them: the exhilaration of speed.

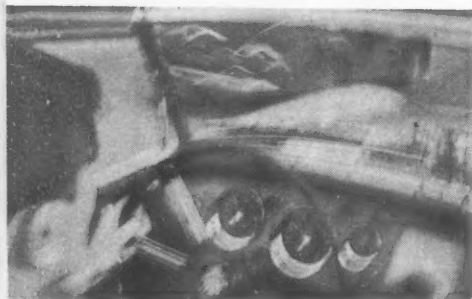
The feeling of speed is more important than speed itself. It's much stronger, for example, when you drive through a tunnel or when you are in a small, low-slung car with a noisy engine. But the most important factor of all is that a driver feels himself to be the absolute master of his speed up to a relatively high limit. He can vary this speed at any time with a ridiculously small effort: a slight pressure of his foot upon the accelerator. This ease gives him an impression of power which satisfies one of man's deepest instincts.

The will to power that was exalted by Nietzsche, was recognized by Alfred Adler, one of the founders of modern psychoanalysis, as one of the roots of man's conduct. Every time a man feels he is expressing his strength—for example the child who lights a firecracker, the village idiot who sets fire to a haystack—he is satisfying a will to power which surges up from his subconscious. In the case of a normal adult, self-control and the demands of living in society force him to repress this instinct or, at least, to channel it into an acceptable path—success in a career, for example.

A car, however, breaks down all these barriers because of the facilities it offers for free expression of the will to power. The car is a very powerful but very docile animal that allows man to identify himself with it completely. He reasons as follows: "Since a car obeys any command immediately, and since this obedience takes the form of a force which depends only upon myself, then I merge with it and my car's power becomes my own power. Its bearings, brakes and wheels, even though they multiply my own power hundreds of times, are just a projection of my body and my will. I can go faster than any horseman trying to whip a gallop out of his reluctant mare. I don't have to obey the law of gravity because I can accelerate going uphill, while a skier is a slave to an incline. I don't go as fast as an aviator, true, but the only way he can prove it is to stay close to the ground—as I do. Besides, he can't land just anywhere, but I can stop wherever I please. The driver of a locomotive is riveted to the track, but I can choose my route. Not only am I free to choose my route, I am also the master of my average speed and of my time. Time here is nothing but space—miles which I can stretch or shrink."

Here, you see the process that leads to a motorist's exaltation. Speed itself is exalting but speed in a car is also the expression of a tremendous force available to man with no effort on his part. The car appears to be a machine for producing supermen.

This, unfortunately, is only a tragic illusion. The driver who allows himself to be trapped by it is childish.





Although a lunatic cannot become an acceptable driver, the intellectual qualities that are required for driving a car are relatively limited. All the necessary movements quickly become automatic and only intuition—a quality halfway between intelligence and sensitivity—is needed to judge the risk presented by a sharp curve, a crossroads or a village.

On the other hand, a man's sensory activities expand considerably as soon as he gets behind the wheel. Driving a car requires constant attention of a particular nature: it is diffused and not concentrated attention. Concentrated attention bears on only one object, but the diffused variety must take in several objects all at once: it must be visual, auditive and muscular simultaneously. These forms of attention are absolutely incompatible. It is impossible, for instance, for the driver of a car to carry on an important business conversation while keeping an eye on traffic lights, pedestrians and other cars. Then, too, the faster you drive, the more your attention must be diffused. This means that your reflexes must become quicker and your senses play a greater role.

Your nerves grow tense, especially because there is no muscular effort to help you strike a physical balance. This increase in sensory activity on the one hand and the decrease in mental activity on the other tend to shatter an individual's normal psychological balance. The driver's idle mind has much less control over his emotions, which tend to express themselves in irritation—all the more so because of the nervous tension involved in driving.

Getting back to the will to power, once it passes a certain threshold it automatically causes egoistical and anti-social conduct. When the feeling of omnipotence and infallibility takes hold of a driver, it incites him to refuse the objects and the persons around him any freedom other than that which he grants by his own whims. The world seems designed to submit to his rule—it has a right to exist only as an extension of his own personality.

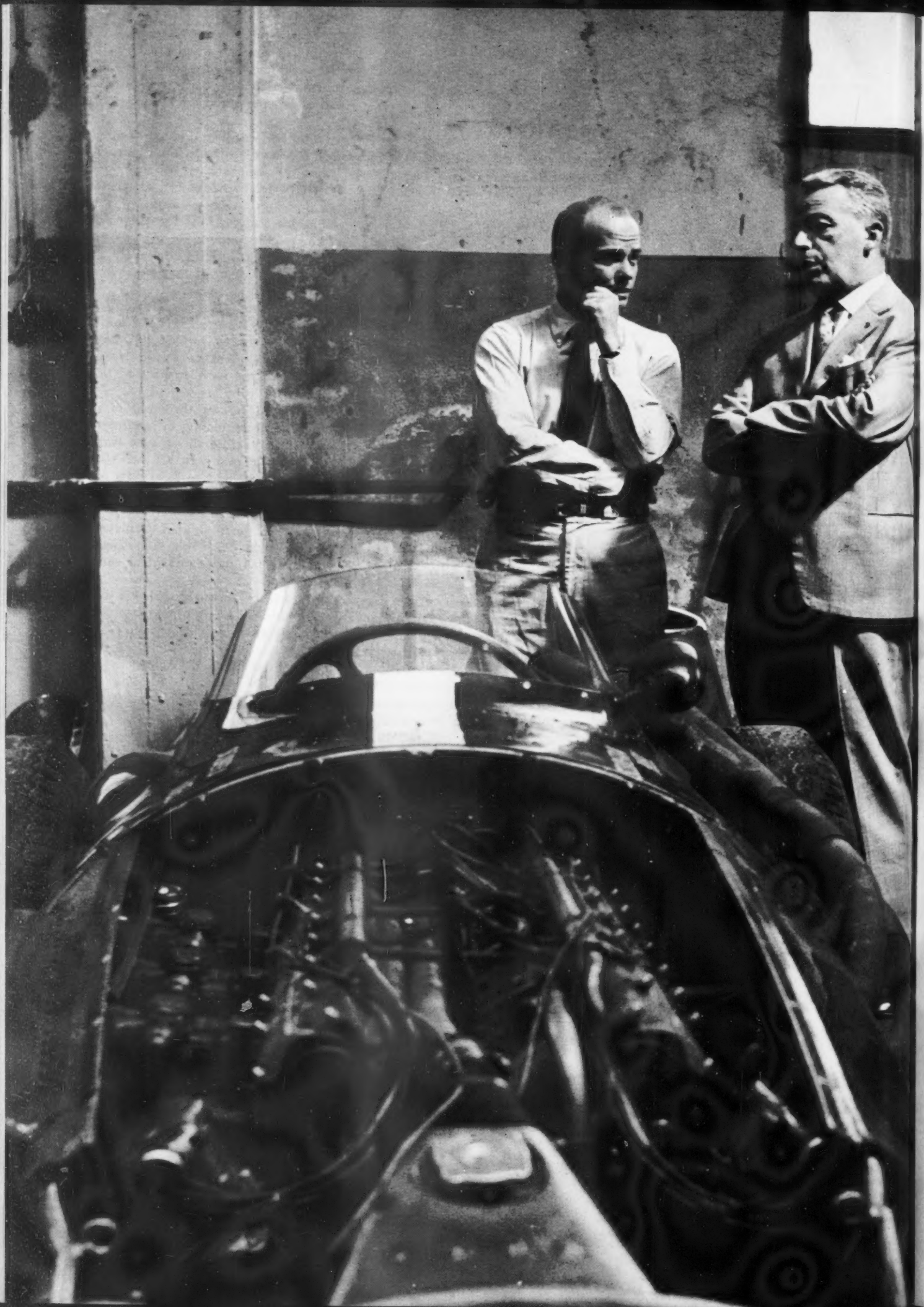
This acute egoism, when coupled with the domination of emotional impulses, is absolutely typical of regression into childish conduct. The small child is characterized by a purely egoistical and emotional outlook on the world. Incapable of distinguishing between himself and other persons, he suffers and becomes irritated as soon as other persons express the least amount of freedom.

The infant stays in a crib, but the driver goes out into the world with his fellow-men—and takes to the highway. If he really allows himself to lapse into purely emotional and egoistical conduct, then the causes of irritation can become infinite. Pedestrians are enemies because they refuse to adapt themselves to his pace and vanish at the right time. The same holds true for slower cars which block his path and present an obstacle to the expression of his power instinct. As for faster cars which pass him, they can also cause frustration because, by expressing their superiority, they diminish his own feeling of power. Instinctively, he steps on the accelerator when someone tries to pass him. If a driver is to resist this temptation, his mind

*(Continued on page 92)*

ROLOFSON







► The 1959 Grand Prix season will, in later years, be considered an historic one in the annals of the sport. It saw the end of one era in road racing and the beginning of a new one. The GP races of the past season offered almost conclusive proof that the winner's circle would be occupied in the future by lighter and smaller cars. Thus the combination of Stirling Moss and the ultra-light—by comparison—Cooper-Climax has dramatically foreshadowed the coming trend in Grand Prix racing.

A significant note as to how far into the new era the sport has gone is the report that the engineers at Ferrari are working on a smaller, lighter, rear-engined car. The over-size, truck-like Maranello monsters have had a bad year, simply because they could not be driven as quickly as the smaller cars on slow circuits. Rivalry within the Ferrari team plus a lack of organization pulled the Scuderia off its pedestal in '59. They had the cars; the V-6 Dino Formula I engine was easily the most powerful of all and it was even fitted with an experimental head half-way through the season. Time would have been better spent on the chassis. The Ferrari-Dunlop disc brakes were without a doubt the best anchors any Ferrari has ever had, but the car just could not be made to handle: it was a case of either too much understeer, or way too much oversteer at the wrong moment.

It's already been pointed out how difficult the Ferrari Formula I car was to drive, but to appreciate this fully one had to watch the Dinos in a corner, observing the driver's faces; the action of the front and rear wheels, and then watch how easily the Coopers and BRM's and even the Aston Martin would skate through. At the finish of a race, particularly at Rheims when the Ferrari won, or at Portugal when Dan Gurney stepped out of the car with his hands practically raw from the red hot steering wheel, the story was told.

The Cooper-Climax came of age in '59. Only this year did we really begin to accept the fact that it was here to stay; with chassis development increasing its size, it now equals the dimensions of the BRM, though appearances deny this. Gearbox lubrication was a problem at the beginning of the year but this was solved by a "Rube Goldberg-ish" rig operating a drip-feed recirculating system from a tank above the transmission housing. It was operated by the driver pulling a chain in the cockpit on signal from John Cooper in the pits, the signal being given by one hand holding the nose, the other raised as if to pull a chain on an old-fashioned toilet. Actually considerable engineering has gone into the Cooper-Climax though on the surface it appears to be un-scientific.

Coventry Climax contributed greatly to the Cooper successes in 1959. With the 2.5 liter engine now fitted with a new cylinder head it is putting out between 240 and 250 horsepower, honest horses as they are quick to point out.

By mid-season, 1959, the need to call certain circuits "Cooper circuits" vanished, for the Surbiton cars proved themselves to be just as fast as the competition on ANY road course. They did not win at Rheims, nor at Avus, but the resounding victory at Monza made motor racing history. At Berlin the Ferraris could not shake off the Coopers on the straightway nor on the banking with Brabham and Gregory insisting that they were not over-revving to accomplish this. Jack Brabham retired at Avus with a broken clutch while Gregory blew his engine. At Monza, Bruce McLaren blew his engine up while Stirling Moss was jinxed with gearbox malfunction right up until Portugal. His brief foray with the British Racing Partnership BRM came to naught, and the car was finally crashed at Avus in the hands of Hans Hermann. Brabham won Monaco and Aintree, was only a minute behind Tony Brooks' victorious Ferrari at Rheims, and third at Monza.

The Cooper-Climax is an adjustable automobile. Front and rear suspension settings can be completely altered in a

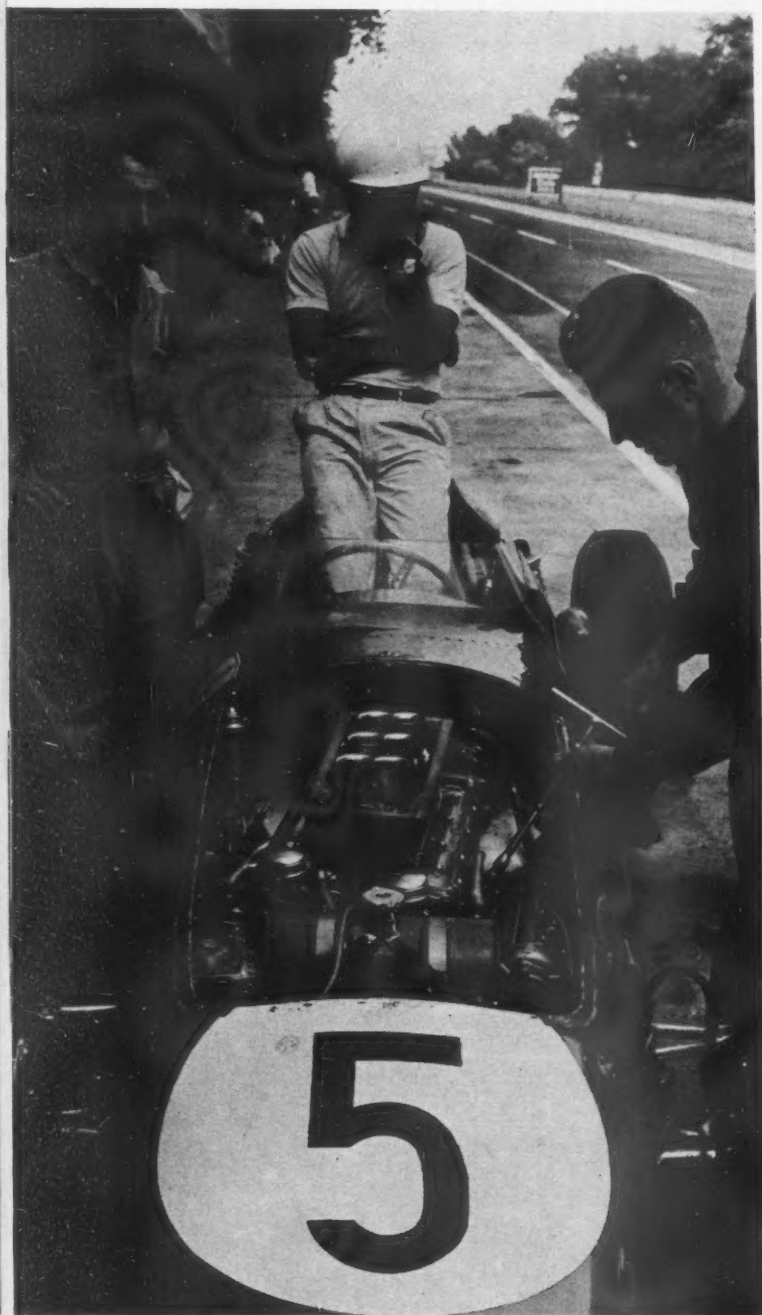


## JESSE ALEXANDER'S 1959 ROAD RACING ROUNDUP



In its first 1959 appearance at Monaco the Ferrari featured a snub snout to evade collisions. Affected with spin-itis there, Phil Hill is here using up all the road in a furious slide out of the Gasometre hairpin. On the facing page, Jesse Alexander gets the straight story from Nello Ugolini, Racing Director for Maserati. The sign of the trident was seldom seen in 1959, private owners being the sole G.P. contestants.

Three seconds after flagfall at Rheims the field is surging away, smoke curling from the spinning Dunlops. Jack Brabham's Cooper crouches between the Ferraris of Brooks and Hill, ahead of Moss' pale green BRM. As below at Avus, Ferrari technicians groped for the right combination all season. The revised, disc-braked Dinos worked on this fast course but wouldn't handle elsewhere. Header tank, bodywork are both "1959".



matter of minutes. The practical approach by John Cooper sorts out problems seemingly as they arise, while the competition spend hours pondering a carburetion problem, getting nowhere. The Colotti gearbox on Rob Walker's cars created problems at the beginning of the season, but once these were overcome and Stirling decided to stay with the stable things began looking up. Faulty manufacture was the primary cause on those outside parts which a small organization like Walker's assumes to be properly made, since they cannot go to the expense and trouble of setting up their own inspection department.

The Lotus Formula I team gave only one outstanding performance in 1959; this was at Zandvoort when both Graham Hill and Innes Ireland finished, Hill coming within seven-tenths of a second in training of the best time set by Bonnier's BRM. In order to put a Lotus on the starting line it has very often been necessary to cannibalize from other cars and more time than would seem to be logically necessary is spent at every race meeting getting the carburetion properly set. Small breakages continue to plague the Lotus, even in the gearbox, but the performance of the Elite GT coupe has been Colin Chapman's saving grace this year.

The BRM tasted sweet victory at Zandvoort. At long last the car won a Grand Epreuve, the Dutch GP won by Jo Bonnier. Since then, however, the Bourne cars have been little better than also-rans. A gasket blew on Bonnier's car at Rheims while Flockhart finished sixth and Schell, seventh. At Aintree, Schell finished a creditable fourth, Bonnier's car retiring with a broken throttle linkage. Then at Avus, Berlin, it was obvious that the BRM's were just not fast enough. In the final overall results Bonnier placed fifth, and Schell, seventh, ten laps behind with clutch trouble. Portugal saw three cars entered, Bonnier retiring on his eleventh lap with fuel feed trouble, Schell and Flockhart finishing fifth and seventh, respectively.





For the Italian Grand Prix, the new rear-engined BRM was ready, though it did not start the actual race, only doing considerable test miles with both Bonnier and Schell driving. BRM's finished seventh and eighth at Monza. And so it went. It's hoped that with their new car, the Owen Racing Organization will be more competitive in 1960; if they are able to attract at least one top-ranking driver to the team they will be a lot better off.

The Cooper-BRM never got farther than the Monaco training session though Moss did drive the car once in England. Its handling was never properly sorted out with the result that the engine went back to BRM and the chassis to Rob Walker for use as a Formula II car.

Another ill-fated racing car in 1959 was the "Tec-Mec," a Formula I machine built around a Colotti-designed space frame. Lack of finances, lack of a driver, plus the fact that the 2.5 liter Maserati engine was out of date kept the car from actually seeing a start line.

The Guild of Motoring Writers, an international group of automotive journalists, voted Jack Brabham their annual "Driver of the Year". He indeed has been the sensation of the year, with the works Cooper-Climax. Usually wearing a golden helmet, Brabham crouches low in the cockpit, hunched over in what would seem to be an uncomfortable slouch. His cornering technique has also been cause for comment, so unusual is it. Jack always seems to have the "tail hung out" with opposite lock on. He has built the Cooper that he drives to handle in this manner, for that's the way he likes to go around corners. Considerable initial understeer allows the car to be "dumped" into the corner, then oversteer comes on in the middle of the corner to power out on opposite lock. This technique can be harder on the tires, for after the Italian Grand Prix the difference between the condition of Moss' tires and Brabham's was

*(Continued on page 76)*



What Phil Hill wants, at upper left, is not what Phil Hill gets unless Ferrari Chief Engineer Carlo Chiti concurs. Driver-designer clashes have been frequent in Ferrari team ranks during the past G.P. season. Tony Brooks, above, was at the wheel the only two times the Italian team won, also put up the best of a bad show in sports car racing. At left, white-garbed Hans Herrmann is briefed by Stirling Moss on operation of British Racing Partnership's BRM at fateful Avus race.



by B. C. George

► We recently drove a car that, when it reaches production, could take the second-car market by storm. The most unusual automobile of conventional configuration to be engineered in this country in many years, it will be manufactured by the Nic-L-Silver Battery Company of Santa Ana, California. There will be no gasoline or air pollution problems with the "Pioneer", as it is called, for this is the most promising to date of the several electric cars being engineered in various cities. Tests thus far indicate operating costs will be under  $\frac{1}{3}$  cent per mile.

The two-seater body is of laminated fiberglass by Alken with a removable hardtop that attaches by four thumb screws. Behind the individual bucket seats, which move far enough back to allow a six-footer reasonable comfort, are twelve 4-volt series-wired batteries of special design made by Nic-L-Silver. Concealed beneath rugged flooring which serves as luggage space, these lead-acid batteries have two cells each with 31 plates per cell and a capacity of eight hours at 235 ampere hours.

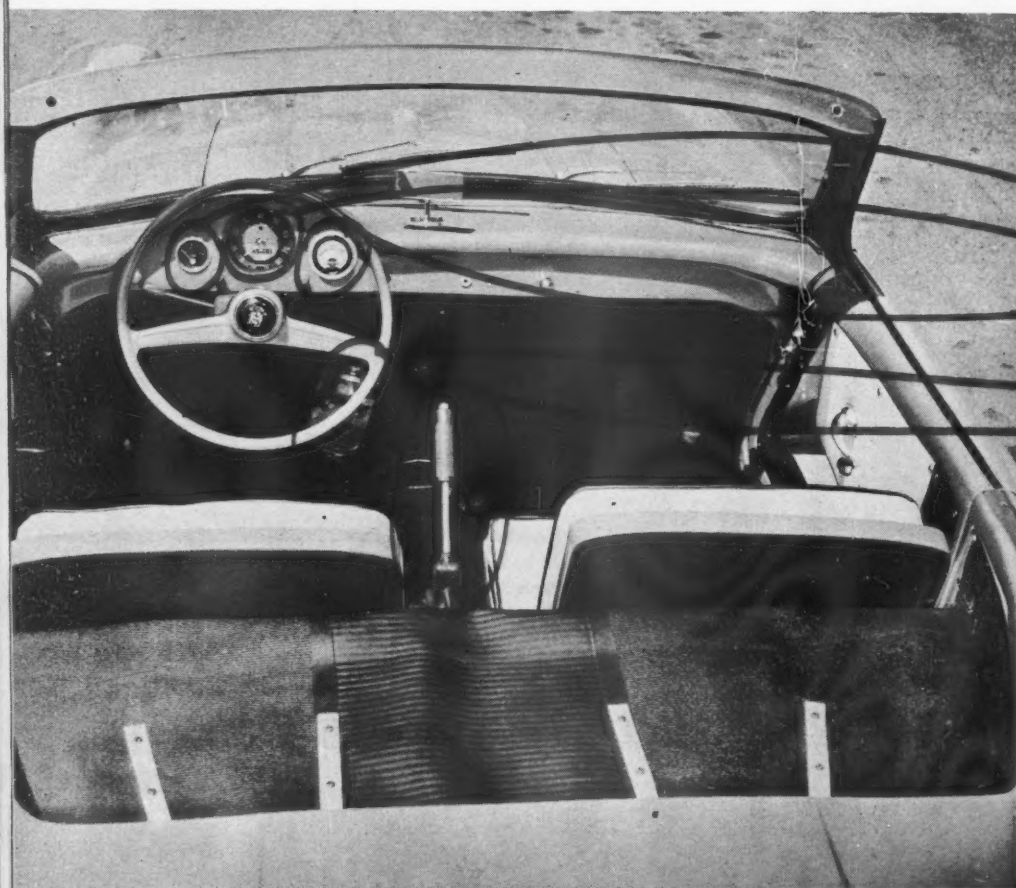
A box section steel frame of simple but rugged construction carries the full torsion bar suspension which closely resembles the Volkswagen layout. Two electric motors, each delivering eight shaft horsepower are used; there is one to each rear wheel, the latter being driven by a rugged sprocket and chain system that is geared down to conserve power. Top speed is 50 miles an hour but acceleration to this maximum is amazingly brisk, quicker than that of the average small imported car.

Driving is simple and most enjoyable. The seats are as comfortable as those in most small sports cars. In fact one sits very low with the legs outstretched. There are two pedals, one being the usual brake pedal which operates a conventional hydraulic system with expanding shoe brakes with one slave cylinder in each wheel. The other pedal is a wide one for acceleration with an operation best described as two-stage. For normal driving at city traffic speeds, 25 to 35 miles an hour, the accelerator is depressed less than half way and the drain on the batteries is 24 volts at the most. For full acceleration and speeds approaching the maximum, the pedal is depressed past the half way mark, whereupon the voltage used approaches or attains the maximum of 48 volts.

The steering system is also conventional recirculating ball type with very easy movement of the wheel even at rest requiring three turns from lock to lock. As the wheelbase is just 95 inches, the Pioneer will turn on a dime; parking will be a breeze with space to spare due to the overall length of 157 inches. The overall width is about 60 inches which should qualify this little runabout for reduced parking rates in many public parking lots.

George Lippincott, the founder and president of Nic-L-Silver, hopes to have ten cars a day rolling off the assembly line now being tooled. Power companies, postal authorities, and dealers throughout the West Coast states are interested in obtaining the first models. As quickly as possible, according to Lippincott, the Pioneer will be produced at a

## Pioneer Electric



Ammeter  
Speedometer and Odometer  
Voltage meter  
Accelerator  
Hand Brake

A far cry from the Baker Electric, the Nic-L-Silver electric car has a very sporting appearance. "Gas" pedal controls current flow.



rate of one hundred a day, national distribution being the eventual intention. The Pioneer has been tested in San Francisco where it devoured the city's famed steep hills in front of utility officials and interested dealers.

The weight of the Pioneer, with the hardtop in place, is 1800 pounds of which over 600 are accounted for by the batteries. The fiberglass body weighs less than 300 pounds.

During our demonstration drive around the outskirts of Santa Ana we experienced the curious glances of motorists in assorted large vehicles. While waiting for traffic lights to change, the complete lack of motor noise is, at first, somewhat ghostly. The two electric motors do not run when the foot is taken off the accelerator. The latter is, in effect, a switch; only when the pedal is pushed do the motors operate. Forward and reverse are controlled by a panel of solenoids and switches actuated by a small toggle switch on the dashboard. The latter contains a conventional speedometer and one other instrument showing the voltage being drawn.

The range of operation varies from 100 to 150 miles according to Lippincott, depending on whether one pushes the performance toward the maximum or is content to stay with the majority of traffic. Not intended to be a touring car with continental range, the Pioneer is aimed at families requiring the utility of a second car but also demanding economy. A battery charger will be standard equipment in each Pioneer. Recharging will take a maximum of eight hours and, despite rumors to the contrary, is from a regular

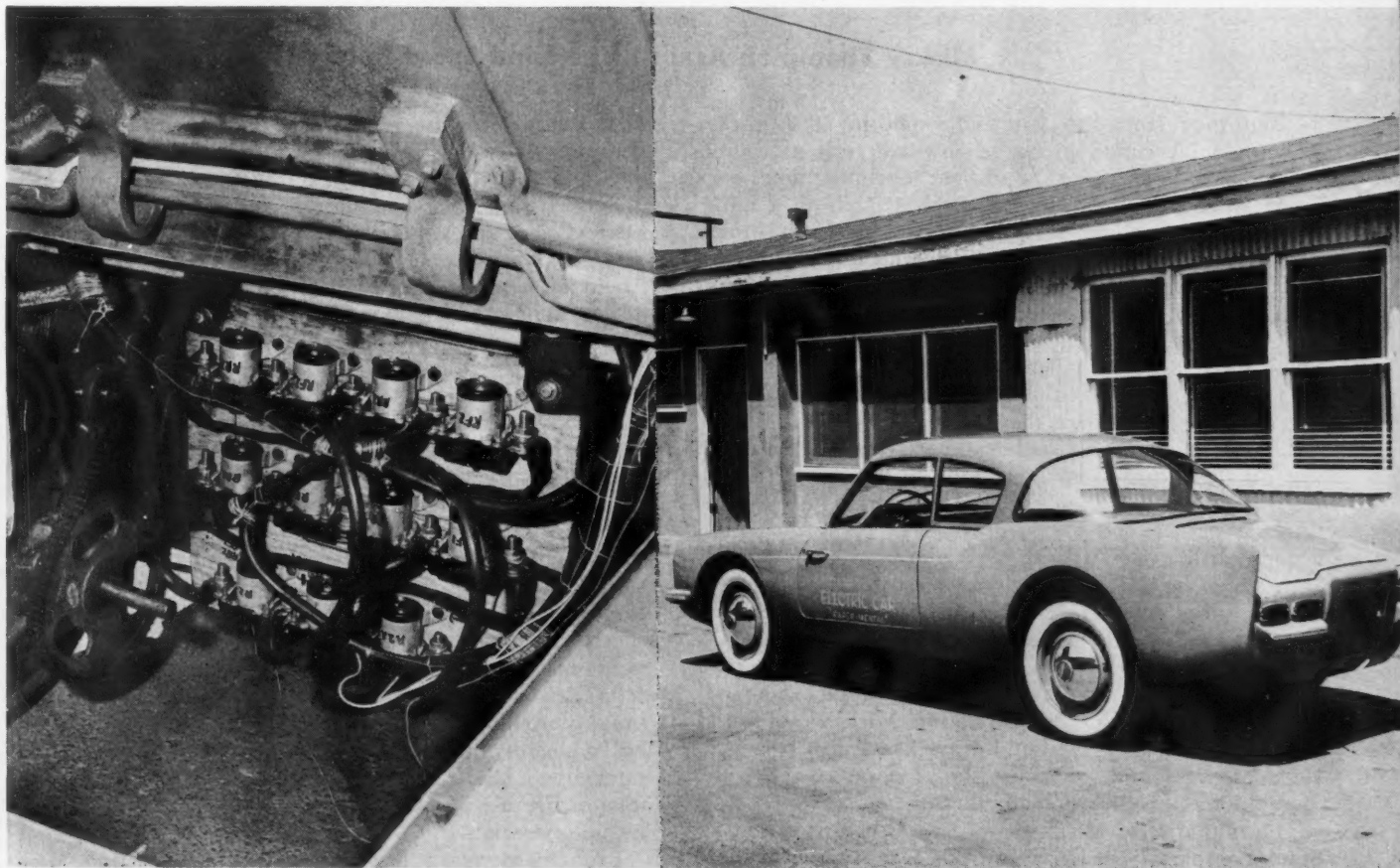
110 volt current outlet. Utility companies have indicated an interest in providing such outlets in selected public parking lots. In most areas a full charge is not likely to cost more than the fourth part of a dollar and where electricity is relatively low in cost, less than 20 cents. If in the process of going to and from work on parkways the driver stepped on it and obtained only 80 or 90 miles total range, he would still have extremely low cost transportation.

The ride is good, telescopic shock absorbers being used. The parking brake will appeal to those who like sports cars: a lever between the seats. The inside panels of the doors are of interesting design with the armrest built in.

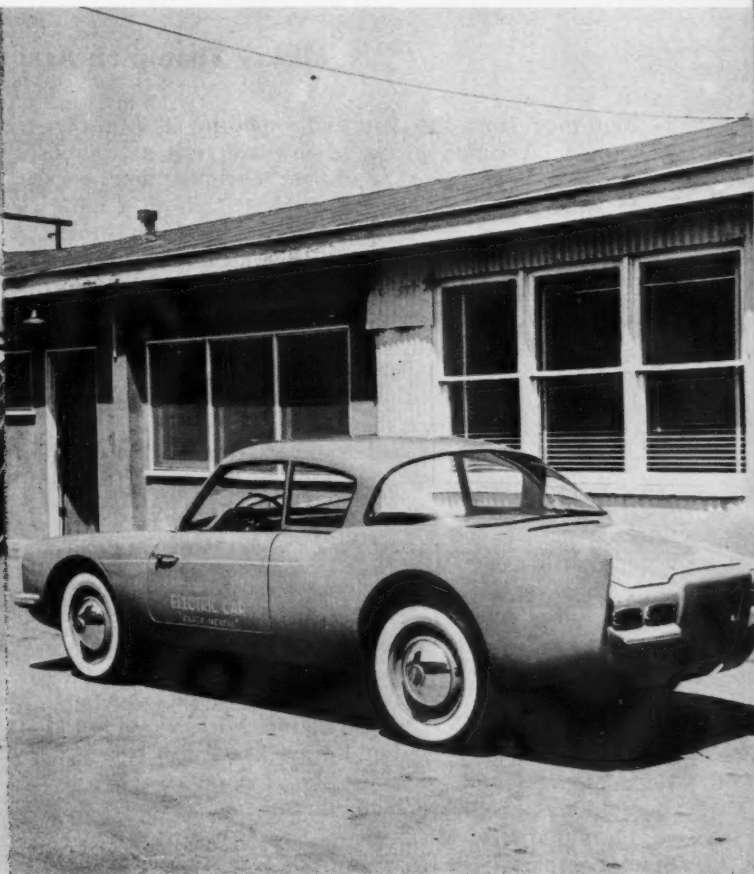
In addition to the space above the batteries and behind the seats, other luggage can be stored beneath the front hood. The space behind the electric motors will be occupied by the battery charger. Maintenance will take little time. Checking the level of the batteries and taking a specific gravity reading occasionally (1.265 is normal) and greasing the chassis is all that is necessary. The latter has a total of three greasing points.

Next to the low cost of operation in importance is the price of the car which, in convertible form, will be \$1995 F.O.B. Santa Ana according to Mr. Lippincott. The batteries will have a useful life of three years and, at that time, will cost less than \$300 to replace. Other than the batteries, there is little to worry about outside of occasional motor brushes. The Pioneer will not be the only electric car but it will probably be the first.

—bcg



Batteries are located underneath the luggage compartment in the rear. Small cylinders are solenoids linked to accelerator.



Prototype car was tried with removable plastic hard top. Here, car is tail high after 12 four-volt batteries have been removed



## THE PISTON ENGINE

### Mickey Thompson Against The Land Speed Record

► Returning from the Bonneville Salt in 1958 Mickey Thompson lay curled in his sedan's back seat as engine-builder Fritz Voigt drove the straight, unending miles back home across the Nevada desert. Behind them on a trailer was the fastest car ever built in America, the blunt, brutal, twin Chrysler-engined streamliner in which Mick had just achieved a staggering 286 mph. Mick was exhausted but couldn't sleep; muscle rested but ambition worked. Lying there, Mick was roughing out a plan for the first American Land Speed Record challenger in over 30 years—since the days when Malcolm Campbell, Ray Keech and Frank Lockhart fought to the death on the Daytona sands.

Though four-engined Challenger I was conceived in a back seat on the return from Bonneville in '58, the dream already was old. Mick, then 29, had been working on fast cars since he was 11, had always dreamed of being the fastest man on earth.

In school he did well in things mechanical and mathematical; other subjects were beneath his serious attention. His best medium for expression was speed on wheels. On the streets, then on the dry lakes, then at Bonneville, then in the Mexican Road Race, then in drag racing he was furiously fast. In whatever class he ran, Mick always ran at the top. He always worked and drove like a man possessed. He does today and, of course, he is possessed... by the compulsion to excel beyond all others.

The similarity of Mick's personality structure to that of Frank Lockhart (SCI, December, '58) is so striking that one

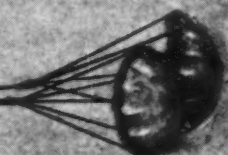
is forced to recognize a pattern in the makeup of men who seriously strive for the fantastic ultimate. Malcolm Campbell and John Cobb also had difficult, driving, driven personalities; but they had money and therefore were not compelled to develop the blind, ruthless intensity of purpose without which the Lockhart and Thompson achievements could not have been made. Campbell and Cobb compulsively scaled their personal Everests in well-upholstered comfort. Lockhart and Thompson frenziedly obeyed their destiny pursued by the apocalyptic horse named Famine.

Every penny Mick had in the world went into Challenger I... and a whole lot more, the sources of which he alone knows. He's the son of a L.A. cop, is married, has two offspring. He works on weekdays as a pressman for a L.A. newspaper. On weekends he manages the Lions' Drag Strip in Long Beach, which he's helped to make one of the best in the country. On the side he runs a trophy business which supplies a large percentage of the more than 280 drag strips throughout the U.S. In his spare time he builds and races sports cars, dragsters and streamliners. No one can understand his energy. Says one close friend, "He hardly ever rests. He's keyed up like a hop-head day and night and can build in an hour what would take most men a week. He has no bad habits, just a crazy metabolism. He doesn't smoke, rarely uses a mild cuss-word and if he accepts an offered beer it's just because it's wet." Like Lockhart, Mick has no time for non-essentials.

Like anyone who is driven by consuming ambition, Mick



## LAST GREAT RIDE? by Griff Borgeson



has been understood by few people and his impatient, urgent, commanding manner has won him few friends, lost him many. In the sport he has always been not just another member of a congenial fraternity but, instead, a self-contained, peripheral fellow-traveller who wages his own solitary struggles against time. Like any egocentric person (we'd be the last to knock egocentricity) who is out to prove himself to the world, Mick is jealous of credit and has been accused of hoarding much more than his share. Like anyone whose mental processes and energy are far, far above the norm, Mick is a born leader of men and his tolerance of insubordination has a short fuse. Being a born leader, he has his pick of followers.

In "4 For 400" in SCI for July, '59 we presented a report on the construction of Challenger I and its background. After that we continued to follow closely the progress of the machine. No drawings existed for the arrangement of its baffling complexity of components; Mick had made the original layout with a piece of chalk on his garage floor. Many knowledgeable observers registered nothing but skepticism about the machine. "Without suspension it will be in the air as much as it's on the ground." "The Pontiac engines will never produce the horsepower—it's just a self-propelled slag heap." "He can't conceivably complete it in time... and where's the money going to come from?" These were a few of the rumbles heard last summer.

But it's been proved numberless times that the sorriest fools in this business of speed are the dogmatists, They Who

Possess The Answers. We knew Mick, his brilliance and his inexorable drive, and granted that the odds were on his side. Backing him up again in the engine department was Fritz Voigt, one of the most subtly skilled men in his field.

Of course the project's timetable was impossible. Goodyear agreed to design and build 450-mph tires in November of '58. Ted Halibrand designed the wheels in January of '59, had machined castings ready in May. Goodyear's new high-speed testing machine was rushed to completion in June. The Press was invited to preview the car at the Beverly Hilton hotel on July 27. Those who had access to the grapevine knew on the 25th that the engines weren't even in Challenger's frame.

It was a typical Thompson photo finish. Mick, Fritz and their helpers worked for 48 hours continuously and had the car in show condition. As they pulled up in front of the hotel the tow car's engine caught fire and Mick saved it with the fire extinguisher yanked from the bare-aluminum-bodied streamliner.

That session at the Beverly Hilton was attended by all of Akron's brass (from one side of the river, at least) and by representatives of every important publication with offices in Southern California. Expert after-dinner speakers cast their spells and then Mickey was given the floor. No one knew how he would handle the situation. This was his first experience in the slick, big-time limelight and those who had a commercial stake in the venture braced themselves for the worst.

But Mickey was terrific. He hadn't slept for two days and nights but he came on graciously and addressed the group of 200 or so with composure, fluency, candor and charm. From being just another specials-builder Mickey Thompson stepped in an instant into command of the realm that he, alone, always had known was his. In that instant Mick proved that he had all that it takes to be a popular King of Speed.

The next landmark was the streamliner's first shakedown, held at Edwards Air Force Base in the Mojave Desert on August 9. Again those of little faith swore he'd never make it, but of course he did. Strapped down in obstetric posture he stood on the big pedal that somehow accurately controlled the throttle plates in 32 Hilborn injectors and the small car shot forward over the dry lakebed. The acceleration was tremendous and Mick was grinning with unanticipated delight when, at 173 mph, he hit a three inch bump. The car leaped three feet into the air (it looked like 30 to the driver), sailed for 66 feet, landed and went into a great, looping spin at around 200 mph.

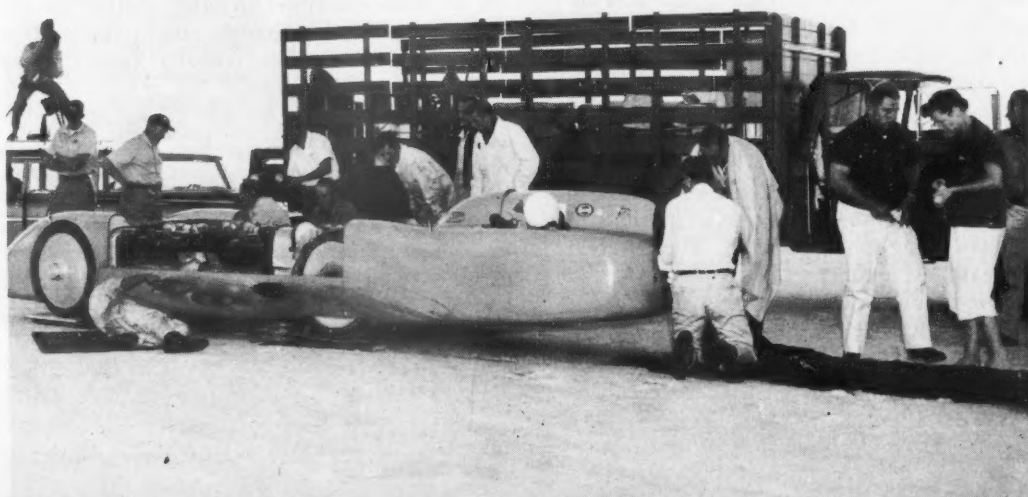
To avoid digging in and flipping Mick kept the throttles open, the wheels spinning. He wrestled the car into a straight trajectory again, stopped it, climbed out and collapsed, battered from head to toe. The skinny Goodyears were ground through several plies, there were no other tires on tap and the maiden voyage was finished. Mick was not hurt. Instead, he was overjoyed by his car's acceleration and handling, by the ruggedness of the tires and the ability of the wheels and chassis to take such violent side-loading.

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PHOTOGRAPHY: BORGESON

Above: Huge billboard in midst of nothing welcomes the Thompson crew and the Challenger to Bonneville. Below: In a record attempt there can never be too much preparation and maintenance. Here the crew checks car after practice run, changing lubricant, coolant and plugs while new brake chute is installed.







Mick in a serious mood as he talks about high speed runs with Captain Eyston and USAC's Joe Petralli.



Above: On his northbound 5 km to 10 mile World Record run Thompson ran out of salt and came to rest in soft mud. The long parachute line came in handy allowing crew and volunteers to pull the car out. Below: Sometimes there's time to laugh. Could be the fact that the car has more engines than the Mobil airplane in the background . . . or more horsepower . . . or maybe it's just from breathing that racing fuel?



# BRABHAM



**by Dennis May**

PHOTOGRAPHY: ALEXANDER

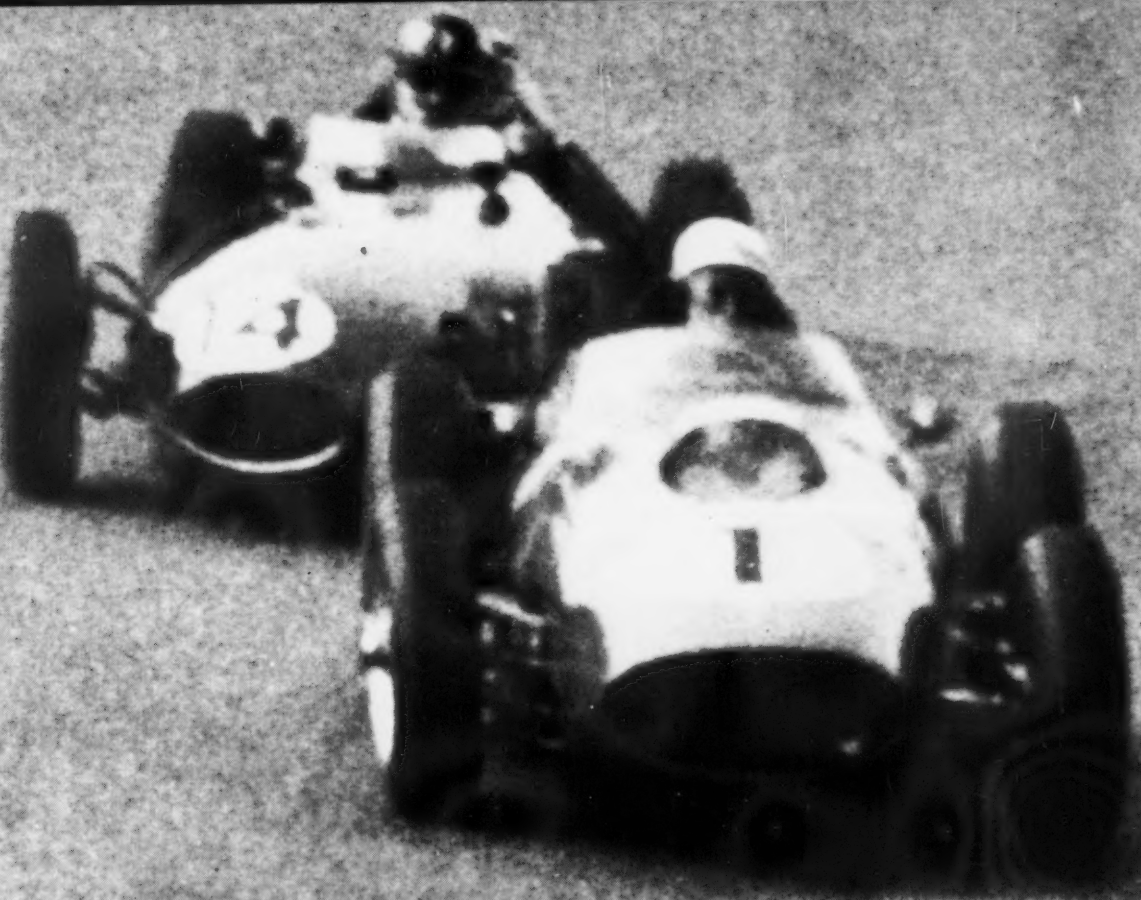
► "If Jack could just unlearn that village-blacksmith cornering technique of his and get himself some decent equipment, a few people would have to watch out". The fortune teller was Peter Collins, the date 1956, the place Aintree, the village blacksmith Jack Brabham, horny-handed son of a Sydney greengrocer.

Collins, killed in August of 1958, lived to see Brabham turn over a new stylistic leaf, earn a place on the Cooper works team and shape course for his subsequent win in the *Autocar's* seasonal Formula 2 championship. In '59, following outright wins in the grands prix of Monaco and Great Britain, second place at Zandvoort, thirds at Rheims and Monza, he topped the table for the World Championship with only the U.S. Grand Prix to go. The Sebring finale, slated for December 12, hadn't come off when this was written. On Sebring eve, Brabham led Moss by 5½ points, Brooks by 8, Phil Hill by 11.

Having led the scoring uninterruptedly throughout the European season, Jack had had ample time, pre-Sebring, to marshal his philosophy relative to the Championship. Naturally he'd be pleased if he won but, like Tony Brooks, he had never lost a wink of sleep as his chances alternately soared and steadied. Whoever else was troubled with insomnia on the night of December 11, it wouldn't be this graduate from the New-South Wales dirt tracks. Commercially, nobody could be indifferent to success in such a league; Jack, having recently set himself up in a Triumph and Rootes Group dealership on the outskirts of Surbiton, Cooper's hometown in Surrey, England, is well situated to translate kudos into pounds sterling. But the limelight that goes with the title, and even with champion-presumptive rating, is a bore, a bane and an embarrassment to him.

Such is the man's artless honesty that nobody who knows him doubts his sincerity in avowing this. Invitations to make speeches at motor club dinners, write magazine articles, hold still for newspaper interviews, endorse products rang-





ing from jockstraps to Judo courses, appear on television, talk on radio: "It's getting to be terrible already, really terrible", he told us back in October. "I dread what it'll be like if we win the Championship".

These sentiments, you may think, will be hard to reconcile with the publication a few months hence of a Jack Brabham autobiography that's in course of preparation. The explanation is this: if authorship committed him to sitting down at a typewriter, or wielding a pen, the book would never have gotten as far as the title page. It doesn't, though. Monosyllabic in public, and in company he doesn't know well, Jack has a surprising muzzle velocity when the mood is on him and he's among close friends, most of whom are Australians. Such a one is Dev Dvoretzky of the London bureau of Australian Consolidated Press. Literary collaborator as well as bosom companion, Dev haunts Brabham's slipstream from Aintree to Avus, finger on the trigger of his tape recorder in readiness for signs that the driver is about to turn on the verbal faucet.

Although by no means ill disposed towards Pommies (Australian for the English) as a race, Brabham has a tendency, which he feels he ought to resist in his own interest, to surround himself in exile with Australasians. His personal mechanic, Tim Wall, formerly with Rob Walker on the Pippbrook stable, is an Aussie. (The F2 Cooper-Climax that Jack ran during 1959 is his own property, which is why he needs a racing mechanic of his own). His manager at the Triumph Rootes agency, Phil Kerr, is from New Zealand. Jack's wife, Betty, is Australian, and their eight year old son, Geoff, was born in Australia. Try and reach Jack on the 'phone and the voice that answers you, nine times out of ten, will identify the speaker with Brabham's household brigade of Antipodeans.

Since Mike Hawthorn was killed, I'd say Jack's personal popularity was unsurpassed among British and Common-

*(Continued on page 94)*





# D.B. SPORTS COUPE

► The DB abounds with the unusual. It has a fiberglass body, front-wheel drive, an air-cooled engine (with only two cylinders) and a frame consisting mainly of a single six-inch tube. About its only conventional feature is that the passengers sit side by side. When, on top of all this, a new importer takes over and the price is dropped, well, will wonders never cease?

The answer to the initial question, "What does D.B. stand for?" is Deutsch Bonnet. To guess from this that it's German is like thinking that MGs are still made at Morris Garages or that DKWs are steam-powered. The Messrs. D. and B. and the car they produce are as French as champagne. Charles Deutsch is a well-known engineer; after he had done the D.B.'s frame, the Trans-Sahara pipeline was a natural assignment. Rene Bonnet (pronounced beau-nay) is an enthusiast; in 1952 he was the first driver to make Sebring international in fact as well as name, winning the Index on, of course, a D.B.

Together, Deutsch and Bonnet produce the only reasonably priced sports car in the country which created sports car racing. Theirs is the only French firm which still races with any success. Their specialty is not the overall win, which costs so much, but the index of performance or handicap victory. Success tastes just as sweet and the budget required is so much smaller. American D.B. owners, who have only BMC "A"-engined cars to contend with in the under-1000 cc H production class, proclaim the D.B. "the dual purpose sports car—it can win, yet it never shows up on a trailer."

Like so many sports cars, the basis of the D.B. is a prosaic family car, in this case the Panhard. One is intended to transport six people economically down long straight roads at mile a minute speeds, while the other carries one-third the number a third faster.

Quite a switch. How is it done? First of all, it's 640 pounds lighter, and the weight is placed low. Secondly, there's 12% more power and a much reduced frontal area. Thirdly, a big help for racing successes, there's a wide selection of gear ratios available.

Proving his D.B.'s dual-purpose character, Ray Heppenstall managed 54 miles per gallon in a recent trip from Philadelphia to Denver and Los Angeles and return on a

successful SCCA point and trophy gathering spree. This is a mighty impressive figure for a car that's all ready to win races. How was it achieved? Small engine and low weight are part of it, but much credit is due that sloping nose and the well-swept, curved windshield that slice the D.B. efficiently through the air. In keeping with good aerodynamics, the headlights and door handles are set flush with the contour. The transparent covers over the sealed beam lights are not legal in some states, but since racing is on private roads, they can always be re-installed at the track. Until recently, D.B.'s shared more than just front-wheel drive with the coffin-nose Cords; they had retracting headlights that folded flush when not in use.

When a firm builds in such quantities as D.B. (about 80-100 cars per year) fiberglass is the most economical material. With a coupe it is easy to get the required rigidity without trouble, but it is difficult to avoid drumming noises and vibration. The D.B., being air-cooled and having only two cylinders, suffers badly in these respects, the rear-view mirror becoming useless at speed. Spots we would criticize are the mountings of the doors and the stay-open props for the trunk lid and hood.

The dashboard itself never shakes or shudders on rough roads, a complaint too often made about cars built in vastly greater numbers. Instruments, by Jaeger, include tach, speedo (accurate within one mph), oil temperature gauge, ammeter and fuel gauge.

Except for its body and frame, the D.B. is basically Panhard. The operative word is basically, as most everything has been altered just a bit to make it more effective for fast driving.

Compression ratio is raised by machining the bottom of the cylinder barrels. Apparently more than enough is taken off and the CR is then adjusted with shims. The SCCA Contest Board must have thrown up their hands in despair, because they list four different ratios as stock, 7.2, 7.8, 8.0 and 8.5 to one. The brochure quotes 8.2, but when he lent us the car, Paul Rossi, the enthusiastic Import Sales Manager at Sholz Buick in White Plains, told us it was 8 to one on this car.

Carburetion is by Zenith twin-choke 38 NDIX and a second one is available and allowable. Other racing options

Front wheels turned inward and throttle on the floor, the D.B. corners in a fast and stable stance showing strong understeer.





In view of its lack of a rear axle, trunk space in the D.B. is limited, but the cord-retained spare tire is easily extracted. The interior is an unusual combination of sports/racing panel and Grande Luxe steering wheel, trim and separate bucket seats.

include a noisier exhaust system, many choices of gear ratios and even a dual ignition system on which the SCCA frowns severely. Well, you have to draw the line somewhere.

The engine was both noisy and rather full of vibrations. At the same time it was smooth in the sense that it responded cleanly to the throttle. The idle speed seemed quite reasonable, but the tach insisted on indicating it as 1300 rpm. At 5700 rpm, a sharp noise set in which we presumed to be valve bounce, despite the power being rated at this same speed. We were later assured by a keen owner, John Hearst, that this was an engine vibration and not valve bounce. On his ex-Howard Hanna coupe with its balanced and X-rayed crank (and dual carbs), the same vibration was experienced. But at 6000 rpm, it was over and done with and there were 700 more rpm in hand. This was discovered after the test car had been returned, but John forestalled any idea of retesting for top speed with the remark that with the standard, unbalanced crank, it was not advisable to try the same trick. Our conclusions about top speed for the normal D.B. are this: 83 mph is easily achieved and usable, while 95 should be possible but not recommended. The balanced crank would be first on our list of options. Incidentally, non-engineers should appreciate that reciprocating engines are not amenable to *perfect* balancing jobs. With certain arrangements and numbers of cylinders, it is possible to get much closer to perfection than with others. The opposed twin falls into the latter category.

With valve crash occurring at the same speed as rated power (5700 rpm), we had sought refuge in the thought that the tach might be inaccurate. Maybe so at idle, but certainly not at 5700 rpm, for the indicated speeds on the within-one-mph speedo jibed exactly with calculations for each shift point based on the standard gear ratios. Being unwilling to make prolonged high-speed runs, we were prepared to accept a quoted top speed of about 100 mph until we realized that 5700 in top was equivalent to merely 83 mph.

Access to the engine is generally good. The hood, awkwardly braced when open, is easily lifted straight off and the entire workings are laid out before you. The valves, closed by tiny torsion bars and inclined to make a hemispherical chamber, are adjusted through large access doors in the wheel wells. The dipstick is easy to spot but tended to catch on the cooling shroud while being withdrawn.

A centrifugal fan at the nose drives cooling air through the shroud. Air from the right cylinder keeps the windshield clear in all but the most humid weather (we're thinking of 99% humidity) while that from the left can be blasted onto the driver's feet.

Immediately behind the engine is the four-speed transmission. It is well hidden by the upper transverse leaf spring, the rack and pinion steering housing and the four prongs of the frame extension. The latter reach forward from the six-inch central tube like grasping fingers to hold the entire power unit in its grip. Several things about the transmission are extraordinary. Only the middle two gears are synchronized, third is direct and the shift pattern is sideways. Not backwards, sideways. Neutral runs fore and aft, with first and second near you and third and fourth closer to the firewall. The odd-numbered ones are on the left, even to the right. Reverse involves lifting up and back, then pushing to the right. Frankly, we didn't like it, but we're told it grows on you.

Even shifting at only 5700 rpm, the test D.B. easily out accelerated a stock Sprite despite nearly identical weights.

(Continued on page 75)



# SPORTS CARS ILLUSTRATED ROAD TEST



D. B. SPORTS COUPE



Price .....\$3195  
 Importer.....Vendome Motors Corp.  
 120 East 56th St.  
 New York 22, N. Y.

TOP SPEED: .....est. 83 mph

## ACCELERATION:

From zero to .....seconds  
 30 mph .....6.1  
 40 mph .....8.7  
 50 mph .....12.9  
 60 mph .....17.4  
 70 mph .....25.3  
 Standing 1/4-mile .....21.5  
 Speed at end of 1/4 .....65 mph

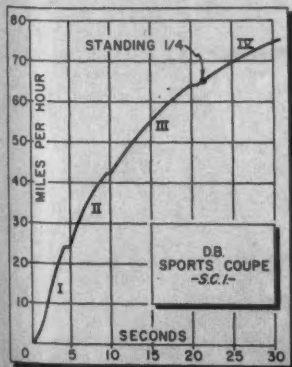
## SPEED RANGES IN GEARS:

.....0-24  
 .....9-42  
 .....15-64  
 .....20-top

## SPEEDO CORRECTION:

Indicated	Timed
30	29
40	39
50	49
60	60
70	70

FUEL CONSUMPTION: 25-35 mpg



## POWER UNIT:

Type.....Air-cooled, opposed Twin  
 Valve Operation .....pushrod,  
 inclined ohv  
 Bore and Stroke.....3.45x2.96 in  
 85x75 mm  
 Stroke/Bore Ratio .....0.88 to 1  
 Displacement .....51.9 cu in—851 cc  
 Compression Ratio .....8.2 to 1  
 Carburetion by.....Zenith 38 NDIX  
 Power (SAE).....56 bhp @ 5700 rpm  
 (net).....50 bhp @ 5700 rpm  
 Torque (net) 47 lbs-ft @ 3500 rpm  
 Useful range .....1200-5700 rpm

## GEAR RATIOS:

Gear	Ratio	Overall mph/1000 rpm
I	2.63	16.17
II	1.50	9.20
III	1.00	6.14
IV	0.77	4.71

## CHASSIS:

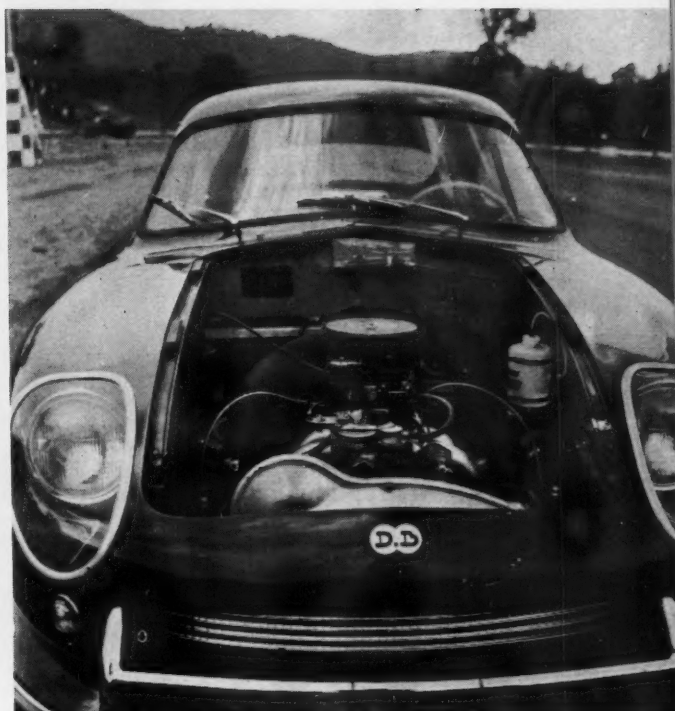
Fiberglass body on single tube frame  
 Wheelbase .....85 in  
 Tread, front and rear .....49 in  
 Front wheel drive, two transverse  
 leaf springs, and lower control arm  
 Rear suspension independent by  
 trailing arm and torsion bars  
 Shock absorbers .....telescopic  
 Steering .....rack and pinion  
 Turns lock to lock .....2  
 Brakes .....drums, 91 1/2 sq in area  
 Tire size .....145x380 Michelin

## GENERAL:

Length .....160 in  
 Width .....63 in  
 Height .....50 in  
 Curb Weight (full tank) 1420 lbs  
 Test Weight .....1750 lbs  
 Weight Distribution, 54 1/2 / 45 1/2  
 Fuel capacity.....16 U.S. gallons

## RATING FACTORS:

Power Output (SAE) .....1.08bhp/cu in  
 Weight/Power test .....31.2 lbs/hp  
 Piston Speed at 60 .....2015 ft/min  
 Braking Area .....105 sq in/ton

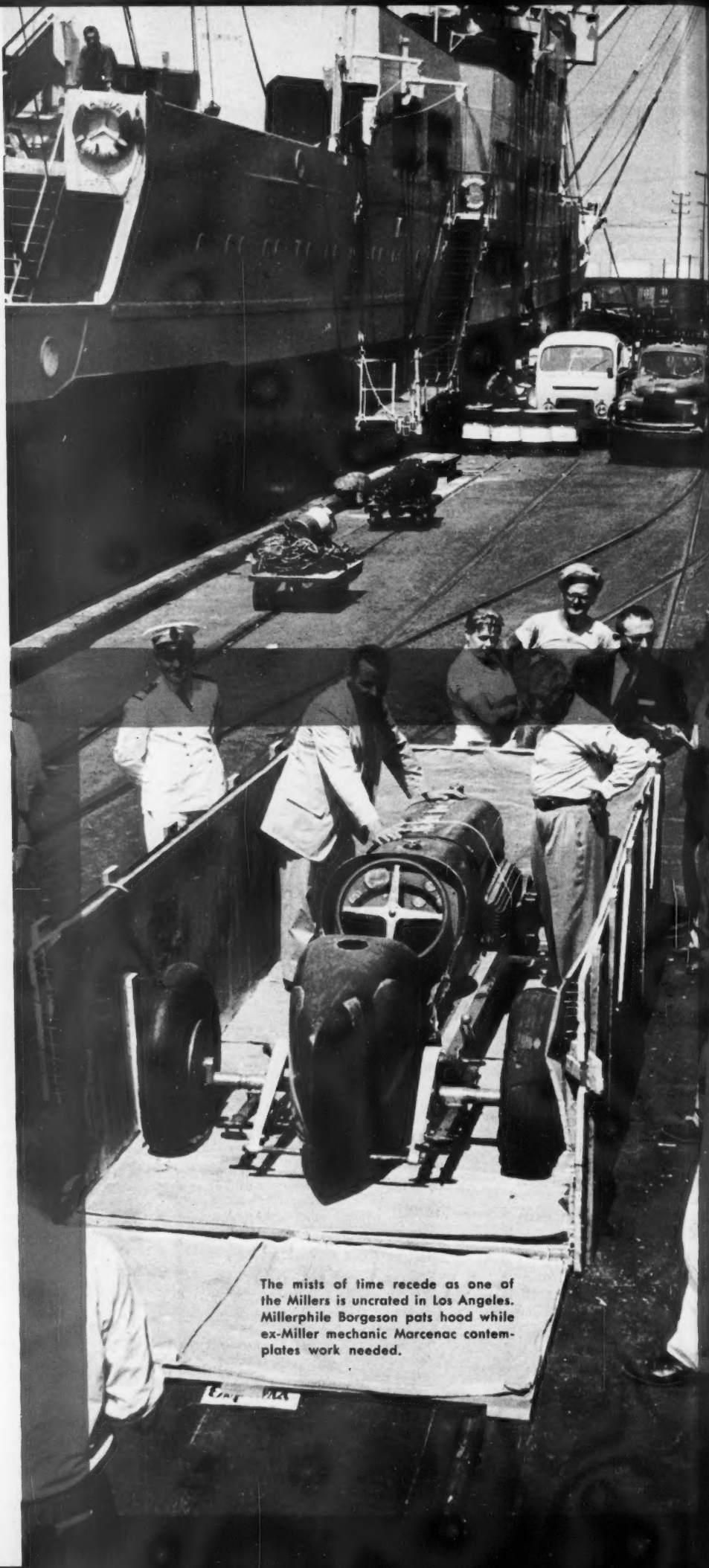


A clever hinge arrangement allows speedy removal of the entire hood. Access to shrouded flat-twin engine is quick and complete. Based generally on earlier Le Mans contenders, aerodynamics of D.B. are good. Tail is truncated according to Dr. Kamm's ideas.

# PROJECT TIME MACHINE

by Griff Borgeson

SPEIRS



The mists of time recede as one of the Millers is uncrated in Los Angeles. Millerphile Borgeson pats hood while ex-Miller mechanic Marcenac contemplates work needed.



► As a child in the 1930's I was privileged to deposit my knuckles' hide on the metal of blown Mercedes-Benz', petite Bugattis, noble Hispanos and Winfield-equipped Ford roadsters. I worked on and drove Duesenbergs, du Ponts, HCS's and Crane-Simplexes. But the ultimate machine I could only glimpse from afar. It was the Miller 91.

The supercharged, 1500 cc Miller was exceedingly rare. About 35 were made, of which about a dozen used front-wheel drive. The conventionally-driven 91's carried a catalog price of \$10,000 in the late Twenties and the FWD's cost exactly \$5,000 more. They dominated thoroughbred racing in the U.S. and drew voluntary expressions of humility from Europe's best designers. Strictly because of their superlative excellence they destroyed the golden age of racing in America. Their incredible performance shamed that of the cast-iron merchants, who withdrew from racing precipitately because it had "become too specialized." Machinery had become too perfect, too costly.

The honors of the Miller 91 are legion. Let's name just a few.

1. Nearly all records on every big-time track in the U.S.
2. One-way of 171 mph on gasoline, turned by Frank Lockhart in a straightaway run in 1927. His two-way record through the AAA clocks was 164.85 mph. One car in the world was faster—a Daytona record machine with 30 times the 91's displacement.
3. In '27 the world record for 250 miles was 116.37, set by Lockhart in a 91. That year Leon Duray averaged 124.7 mph for 250 miles on the 1¼-mile Culver City board track.
4. In 1928 Duray set the Indianapolis lap record at 124.018 mph. This was not exceeded until 1937—the longest the record has ever remained unbroken.
5. That same year Duray set the absolute world record for speed on a closed course, using the then-unfinished 2½ mile Packard Proving Ground track. His record of 148.17 mph stood for 26 years.

Duray's remarkable speeds were, admittedly, helped by his exceptional skill and courage as a driver and by his unusual ability as a practical engineer. He, personally, pioneered the use of methanol fuel, and the trademarks of *Le Diable Noir* were his black racing costume and the unique supercharger intercooler which he had designed. In '29 he changed his racing colors from black to violet and campaigned a team of three 91's under the name of Packard Cable Specials and the sponsorship of the Packard Electric Division of GM. The Indianapolis race that year marked the end of the 91 cubic inch formula in the U.S. and the adoption of the 366 cubic inch so-called Junk Formula. Dural sold his rear-drive car and took his two remaining front-drives to Europe, where he hoped they could be disposed of at a better price than in the U.S. One of the greatest mechanic-engineers in American racing worked with Duray on these cars throughout 1929: Jean Marcenac.

Duray's first essay on this European campaign was to attack the absolute closed-course record on the Montlhéry track. Although its circumference was only half that of the Packard track, in early August he was clocked officially at 143.169 mph.

Wrote G. Fraichard in PARIS MATCH, "With a 1500 cc car or, to be more precise, with a car of 10 CV taxable horsepower, to achieve such speed proves clearly that the Americans are far in advance of us. We have no French cars of similar displacement capable of rivalling the speed of these Millers." Or of any displacement, he could have added.

To Ettore Bugatti these were bitter words.

A month later Duray and his spidery, violet cars competed in the Monza Grand Prix. After he had set a new lap record at just under 120 mph, Duray's luck soured and both of his cars were eliminated from the race by minor mechanical failures.

At this point Duray found a taker for his cars. Ettore Bugatti wanted them and got them in exchange for a sum of cash and three brand-new Bugatti 2.3 liter, supercharged Targa Florio models which Duray brought to Hollywood and sold. Bugatti immediately tore down and analyzed the Miller engines and adapted the Miller top-end design to his own purposes. All Bugatti engines from the Type 51 onward breathed more freely thanks to Miller-derived design. And the Packard Cable Specials passed into limbo.

In 1951 I made the acquaintance of Leon Duray, who had retired to the pleasant high-desert community of Twenty Nine Palms, Calif. I asked him what had become of the old cars. He had no idea. Of those days Duray retained only a few photos, a French medal and a fine gold pocket chronograph on the back of which were engraved the date and speeds of his Packard test track records.

In 1954 the story of a visit to Molsheim appeared in *Bugattics*, the publication of the Bugatti Owners Club of England; included in the illustrations was a photo of the two ex-Duray machines, covered with dust in the Bugatti factory. I lost no time in writing the author of the article and the factory, asking the former for general information and the latter (a) if the cars still were at the factory, (b) their condition and (c) if they could be purchased.

Author J. D. Scheel of the Royal Danish Embassy in London sent photos of the cars which he had taken in '53. He had been informed that the cars were the Cooper Specials which Earl Cooper and Pete Kreis had driven in the Grand Prix of Europe at Monza in '27, in which Cooper finished third. Evidently the cars had been covered with a protective coating of grease or cosmoline and their Packard Cable identification was not visible.

M. Arnaud, secretary-general of Automobiles Bugatti, replied that the cars still were on the premises, that they might eventually consider selling them to me and that I should be fully aware of the missing-parts situation: the superchargers, mags and carbs were gone.

I wrote back saying, "Fine. Kindly quote me the price of *les deux voitures de course Miller*."

Here communications bogged down. Bugatti were reluctant to quote and I hesitated to bid. After a couple of years of indecisive correspondence I asked American *Bugattiste* Bob Estes to look the cars over for me on his next trip to Europe. On his return he reported, "They look very rough. One car's engine is on the floor with its blocks off and with the rods and pistons sticking out of the case. But there should be enough parts to build one completely restored car."

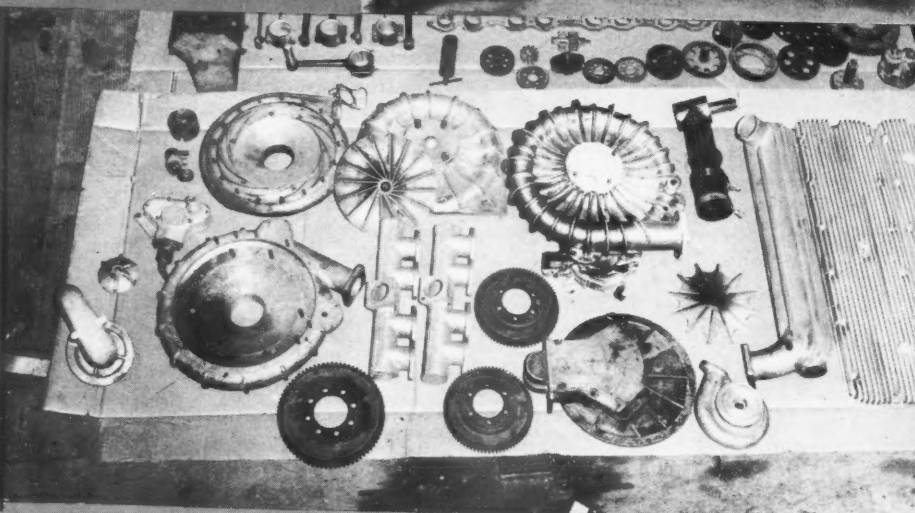
"Good," I said. "I'd like to go ahead with the purchase. Please try to work out a price with them on your next trip to Molsheim." Estes, a far-gone collector himself, may have suffered the frustrated passion of Cyrano de Bergerac but he continued to negotiate on my behalf and, after a session with director-general Pierre Marco at the factory in Oct. '58, he came back with a firm price for the two cars. It was a fair price to both sides.

Then began the arrangement of final details, with liberal use of cablegrams and the transatlantic telephone. Jean Marcenac, who had served in the French Air Force in the first World War, had known Ernest Henri, had been Jean Chassagne's riding mechanic and had come to the U.S. with the Ballot team immediately after the war, handled the conversations in well-remembered French punctuated with frequent OK's. The details took time, particularly the financial arrangements.

This is where SCI and the Ziff-Davis Publishing Co. entered the scene. To my amazement they offered substantial financial help for a project that they immediately recognized as being significant to the history of the American automobile. It is because of this invaluable sponsorship, this very tangible respect for the glories of the past, that the ex-Duray, ex-Bugatti Millers have been re-named

ALEXANDER

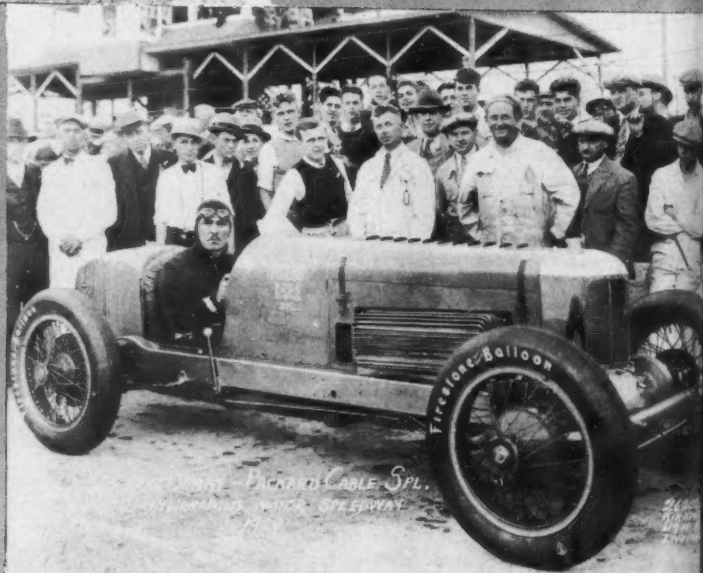
In March of '59 the 71s looked like this when viewed at Mol-sheim by our man in Europe, Jesse Alexander. Sedan in the background was one of the first post-war Type 101s built.



Miller 91 engines were among the first to use an intercooler (right in photo) to bring down temperature of mixture enroute from supercharger to combustion chambers.

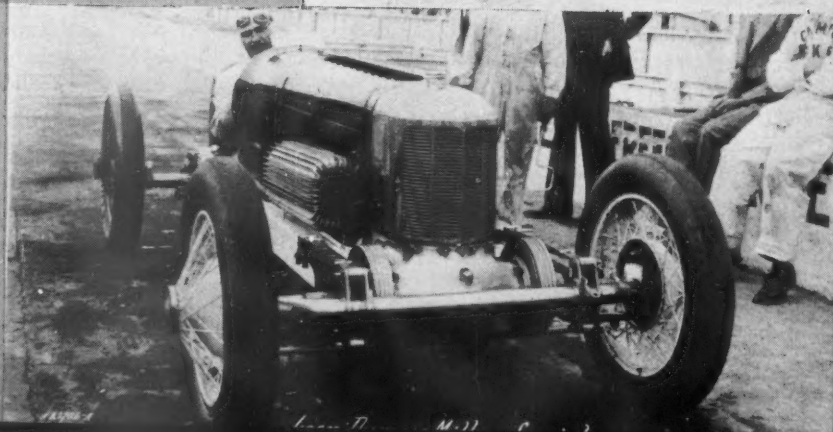
BORGESON

Leon Duray and the Miller 91 was an over-powering combination at the "Brickyard." FWD acceleration off the corners at Indy was just to much for the rear drive competition.



PHOTOGRAPHY: KIRKPATRICK

Front wheel brakes are inboard on the Miller 91, while the de dion-type front axle perches on sets of upper and lower quarter elliptic springs.





## Sports Cars Illustrated Specials.

Because the cars were disassembled when Estes had examined them it seemed highly desirable that we have a knowledgeable representative supervise their packing in Molsheim; Bugatti recommended this independently. What they did not say was that they had put skilled mechanics to work on the cars, cleaning them and assembling all dismantled parts.

On a flying trip to Europe John Christy went through Molsheim to examine the cars. "You won't believe it when you see them," he reported. They're in unbelievably good shape except for tires that naturally have decayed. You can still smell the fuel in the tanks!"

Wrote Karl Ludvigsen from Europe in March, "The cars are ready to go as they stand. Considering the time and the trials these two cars have been through, their condition is literally *staggering*. The purple paint, the Packard Cable Special lettering, all is tatty but intact. It was a blinding glimpse into the past."

So we gave Bugatti the go-ahead, asked them to have the crating done by the most competent people possible which, we found, in France translates as American Express. Weeks passed and I had visions of the cars sitting, exposed, on a dock at Le Havre but the worry was unnecessary.

Marcenac was keyed up like a young bride. "I'll give you any reasonable help, my son," he said. "If you can get the engines running, bring them here and I'll tune them for you on the Novi dyno. Don't expect that 280 hp that some people used to claim. But I can get you an easy 230."

Leo Goossen (he did the original engineering on the 91, chassis and all) of Meyer & Drake (says Lou Meyer, "Best engine we ever built was the 91.") was excited too. "Bring your technical problems to me," he said. "And if you get the cars running then let's get together. I've got some ideas for improving the 91."

As the word spread that the cars were coming, help and offers of help began coming in. Bunny Phillips, who used to drive Millers and Bugattis on the Championship Trail, had preserved practically all of the original Miller 91 patterns and engineering drawings and made them available to the project. Gordon Schroeder, who had owned the Lockhart streamliner 91-based engine, contributed tools, including a tooling jig for milling all the surfaces on the 91 block. Ernie Olson contributed special Miller spanner wrenches that he'd had wrapped up for 30 years. From enthusiast John Cannon came replacements for the missing superchargers. Bill Kenz of Bonneville fame scoured Denver and came up with more blower parts.

Companies helped. Brown & Sharpe, whose micrometers are the world's best, offered to help with precision measuring instruments. Proto Tool Company, anticipating unusual tool problems, offered to help with these. Firestone Tire & Rubber Co. managed to find eight of the last 20-inch Indy tires (800x20's built for the Novis) in existence and made them available at a sporting price. Goodyear Tire and Rubber Co. had an old 500 x 20 mold shipped from their

Australian plant in which new tires of vintage dimensions can be made.

These are just a few of the firms and individuals whose imagination has been fired by Project Time Machine. The project is far too complex to be executed successfully by one person. It's a labor of love that needs many helpers.

On July 30 the French Line's MS Wyoming docked in Los Angeles Harbor. The local office of American Express relished its participation in an off-beat, historic situation: the return to their birthplace of what appear to be the last front-wheel drive Miller 91's in existence. The French Line people enjoyed it too and, when American Express proposed a press reception for the unloading of the Millers, the French Line offered the hospitality of its ship.

Marcenac and Olson were there to catch the first glimpse of ancient machines with which they had helped to create racing history. So was driver Pete de Paolo, who had won the National Championship in '29 in a FWD 91. Bunny Phillips arrived in a pristine Type 57 Bugatti convertible, along with other racing personalities. The press was there in force, TV cameras ground and NBC's Monitor taped the occasion. Seeing the crates opened, catching the first sight of the cars on American soil in three decades, was unforgettable and very moving.

Following this ceremony we all retired to the festively-bedecked ship where we enjoyed *hors d'oeuvres*, fine wines and vintage, bi-lingual bench racing. Big Collector and SCCA-USAC functionary Lindley Bothwell had one of his trailaway trucks standing by. After the last cork was popped we said good-bye to our French hosts and took the 91's to my mountain retreat which, by the sheerest coincidence, happens to be a stone's throw from Harry Miller's famous old Malibu ranch.

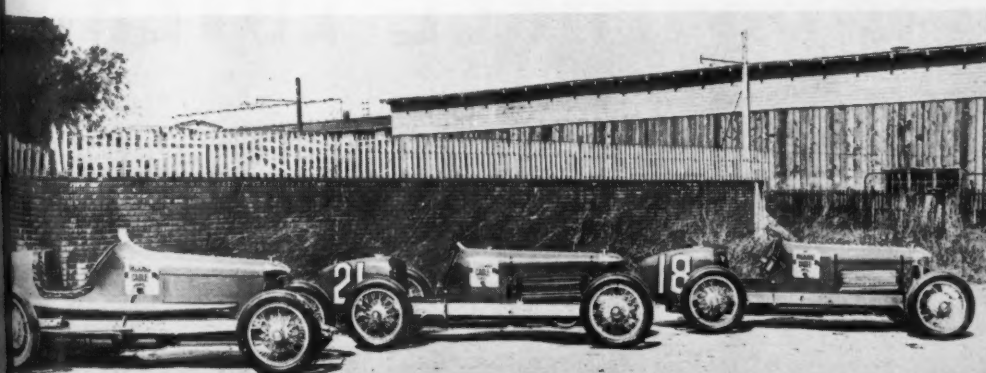
What happens now? Well, in spite of a crowded schedule the restoration project moves ahead. One car is being left untouched for the present and the other is being torn down to its frame. In time there should be a before-and-after exhibit that will tell a remarkable story.

Restoring the cars to like-new appearance for public exhibition will be relatively easy and, barring unforeseen acts of God, will be accomplished with spectacular results. That is the formal, stated goal of Project Time Machine.

But many of us, of course, want these cars to spring to life once more. We want to hear the unique scream of almost dollar-sized pistons pumping at 8,000 rpm, trains of spur-cut gears howling and blower impellers winding out to 40,000 rpm. The problems that may be encountered here are unpredictable and it would be extravagant to promise that the cars will run again. However, all stressed parts are being Magnafluxed or Zygloed and the project proceeds on the assumption that they *will* run again. Time will tell.

Meanwhile, we have a matchless opportunity to study and analyze the design and construction of vehicles that are widely recognized as *the* high point of American automotive achievement. Our next report on the SCI Specials will contain the factual and photographic results of this study.

-gb



In their salad days the Miller 91s were raced as the Packard Cable Specials. Here, the two front wheel drive cars—21 and 18—and the lone RWD car line up for their picture before the start of the racing season.

BORGESON

► How do you apologize to a car?

That's what we wondered after 16 hours on a double crossing of the Appalachian Mountains during the early stages of the American International Rally. The car was a Corvair. The apology was due because of us and the way we reacted to the idea of driving the new Corvair on its first competition test.

We were not professional road testers, we certainly were not Detroit apologists, and we positively had no connection with General Motors. We were three ordinary sports car enthusiasts, ordinary in our scorn of Detroit, in our suspicion of road tests, and in our resistance to being "had" by the offer of a dealer-sponsored car for the big event.

The three of us in the crew of car #19 represented the ownership of two Alfa Veloces, an Aston, a Jaguar, and a TF. We all held competition licenses, each claimed a minimum of five years in the sport, and were nearly one hundred percent do-it-yourselfers in car maintenance and repair. As a side-light, we were all members of SCI's Club of the Year, Midwest Sports Car Club. Professionally, we were also typical sports car owners—an engineer, a social worker, and an editor—the usual kind of broad cross-section of jobs found among sports car drivers.

In short, we were typically biased sports car buffs. And we were very leery of the Corvair.

Oh, it had undoubted technical innovations of interest. But, emotionally, we almost resented Detroit coming up with something really good. And we were far too wise not to know that there would be compromises—dreadful pandering to the mistaken tastes of American drivers. It would wallow in the corners, it would oscillate in the straights, it was dishonestly engineered to disguise inherent oversteer, it would be gutless on the hills, and with only three forward gears it was useless for anything but grocery pickups. Fun to drive? It would be a bore to drive.

Sure enough. We were right. All the way from our Chicago residences to the Detroit starting point of the rally and onto the Ohio Turnpike and south in Ohio after the start—we were right. "She needs stiffer shocks." "This steering ratio is ridiculous." "Eighty horsepower in a 2500 pound car is pitiful." "There's a gear missing between second and third."

We even got off the U.S. highway "suggested" rally route from Detroit to North Carolina in order to play on some twisty hill roads. The driver tried a few things. The reaction of his two co-drivers was to letter carefully a piece of masking tape with the statement, "I am not an Alfa" and to stick it to the center of the dashboard. In certain subsequent maneuvers, an admonishing finger gravely tapped the masking tape and the driver soberly decelerated.

Then a funny thing happened. It began to rain. I happened to be driving. It was mid-day and our three a.m. start had tucked to sleep my two cohorts, Roger Dick and Ken Recu. We were in some exceedingly hilly country, rain-slick and filmed with West Virginia red mud from road construction. I got in way over my head on a mountain turn. It was "way over my head" according to our agreed-upon standards as to what the Corvair would do without coming all apart at the rear end—and what she would not do. And she didn't come apart at the rear end. She washed out her front end, tucked her tail out, asked for some throttle before the apex and very small wheel movements, please. She went around the corner controllably, quickly and, to me, astoundingly.

I couldn't do anything but grunt and try again. Trying again meant going into a blind corner far faster than we had thought any Corvair should ever go. The same thing. She thrived on it. We were twenty-five per cent faster through the bends with security and enormously more enjoyment.

Twenty miles of wet corners later I will still be blinking with astonishment but grinning with pleasure. Of course, it's an oversteering car. It's a tendency, not a violent characteristic. Of course, it doesn't have the Porsche power/weight ratio to bust it through the corner on the throttle. After raising the tire pressures to smooth out the cornering switch from over- to understeer, you corner the Corvair fast by resisting the impulse to overcontrol. You let this remarkably stable lady push herself around the corner. In sequence, the technique is to dive in faster than you think you should, brake late, and keep your cotton-picking fingers away from violent wheel movements. The limited steering necessary to start you into the corner is enough to set the rear end out. The four-and-a-half turns lock-to-lock are of inconsequential concern as you use so little wheel, letting the sliding rear end steer you around the corner. All of this, of course, means you can "get on it" again much sooner than early experimentation would indicate—and this helps enormously because there are only 80 horsepower to push you.

My driving stint done and Ken awake for his, I turned the wheel over without much description of what had happened, simply saying, "You can go much, much faster than you think you can." It would be fun to see him find out for himself. As it got dark, still pouring rain, he cut through the mountains at Bluefield—and found out. Then, we map-read a brief eight-mile mountain road, utterly off the "suggested" route, around Wytheville, Virginia. It was patched, wet blacktop, a lane-and-a-half wide. Ken hammered the Corvair into one blind corner after another, second to third to second stuff, foot on or near the floor much of the time, visi-

(Continued on page 72)

A Corvair on the American International Rally.

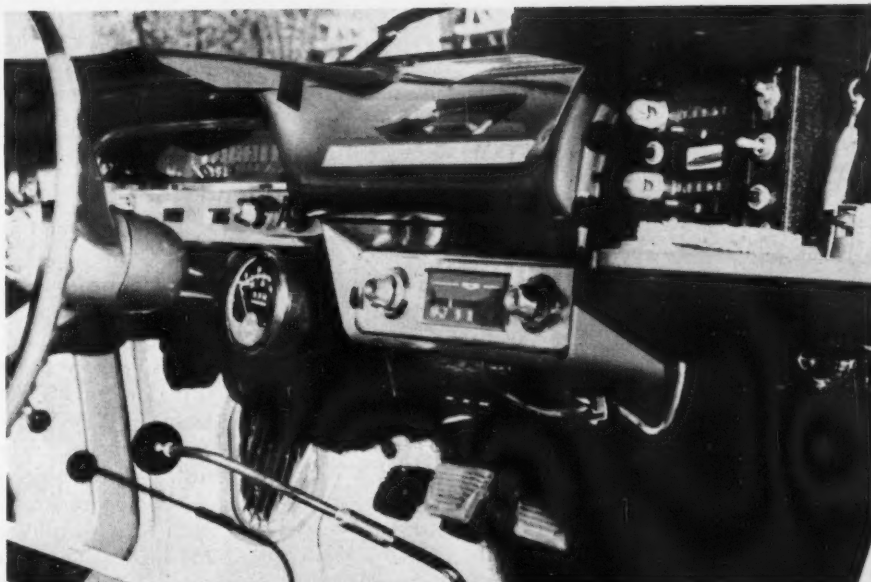
by Dic Van der Feen

# A LADY FINDS THREE LOVERS





Rally-ready Corvair had gear shift lever extension, and tach mounted on steering column. Dual electric odometer—reading in hundreds—was neatly installed in sponge rubber. Other equipment included short wave radio for time checks.



Twisting the Corvair's tail through a fast bend in Tennessee. Crew on car #19 tried old racing trick of filling tires with nitrogen to reduce heat expansion that affected odometer readings.





## THIS IS A SPORTS CAR

Designed with production in mind, new XP-6 Bocar has lengthened frame, solid front axle. Use of supercharger provides racing performance coupled with tractability for street use. Components are chosen to facilitate service away from Denver factory. **by K. Ludvigsen**

PHOTOGRAPHY: LUDVIGSEN

► "The Bocar—for the man who would like to say, 'I own the fastest, safest sports car in the world.'" Ebullient Bob Carnes is working toward a sports car design that will live up to this exciting slogan. More significantly, Carnes' goal is to produce and sell such cars at a price well below that of any other vehicle that might conceivably make such a claim. This, in high-labor-cost America, is an accomplishment.

To SCI "safe" implies a vehicle with sturdy construction and impeccable road manners; one which would be running well within its limits in active competition on a road course. Bob Carnes is approaching this brand of "primary safety" by aiming at a sports car that fulfills the purist, textbook definition of same: suited equally to highway or racing use. The Bocar XP-6 is intended to be the kind of machine you can drive to and from the course, pausing there only to check tire pressures before winning the main event—against any competition extant in America today. This is the goal. The XP-6 has not yet proved that she can reach it, but she shows salient signs of being eager to try. The fifteenth car built in as many months by the Bocar Manufacturing Company, the XP-6 we show here is a sweet-running machine. It got that way through lengthy planning and experience, and is itself a prototype of a new breed of Bocars.

Blessed apparently from birth with a charging, nigh lurid driving style that admits no equals, 38-year-old Bob Carnes is Bocar (BOB CARnes). Bob's experience with sports cars encompasses a miscellany of machines from one of the rare early Glöckler Porsches through an innocuous-looking Jag coupe powered by a Cadillac engine. Four SU carbs gave this Jagillac the wide useful rpm range it needed to excel in hillclimbs in the Denver area. It must be said that Bob's pull-no-punches expression of his strong views on racing hasn't endeared him to local SCCA moguls, a fact which he would cheerfully admit and which doesn't concern him in the slightest (except when the cars he regards as competition show a tendency to race SCCA only!). Time and again it has been clear that a car-building project like Bocar cannot even get under way, let alone succeed, in the U.S. unless an individual of unusual initiative is behind it. Money is necessary but it is not the whole requirement. Bob Carnes' example proves this.

### THE EARLY X'S

Bob first set up shop in April, 1958 in his garage, where the X-1 Bocar was designed and built. At this point I should mention that the designations used have real meaning. "X"

alone signifies that the car is an experimental prototype, while "XP" indicates that the design is in or destined for production. The sole X-1 wasn't a satisfactory all-round car but has since proved a potent drag machine in the hands of Charles Cobb of Marshall, Texas. A handful of X-2's and X-3's were built and sold before Carnes came upon a combination good enough to be marketed as the XP-4. About five of these were fabricated in the new Bocar plant on Denver's west side, all of them Chevy-powered except for one Pontiac.

This first production run used Jaguar wire wheels and Girling drum brakes, which were up to the job but obviously not ideal for a car to be built in this country. Dunlop/Jaguar disc brakes were also tried, but on the relatively light Bocar they tended to "pull" to one side or the other more than Carnes cared for, especially in the wet. This same difficulty was even more evident when Chevy's Cerametallic brakes were tried. Both phenomena might partly be attributable to the shortness of the early Bocar's wheelbase (90 inches) in relation to its tread width (about 52 inches).

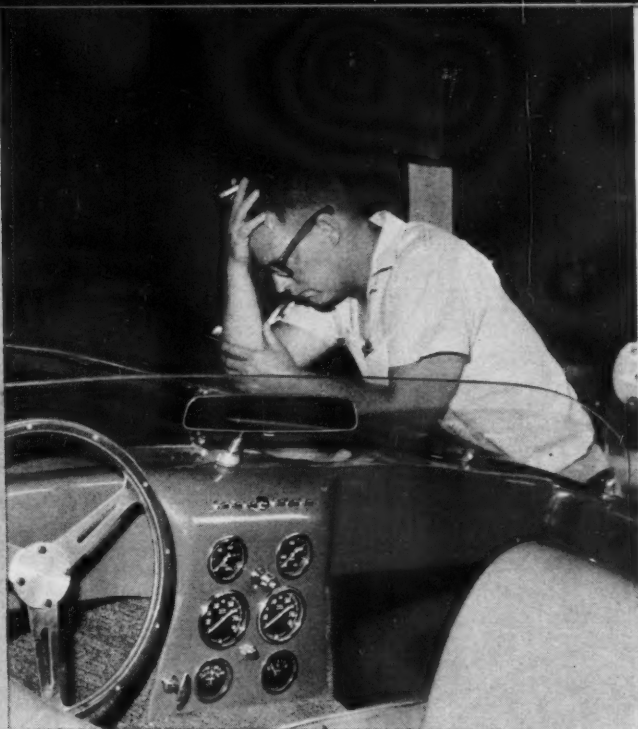
In mid-'59 Bocar Inc. was under way on a second batch of five of the current "bread and butter" models: the XP-5 which has already been discussed in other journals. Its 90-inch wheelbase is 14 inches shorter than that of the XP-6, which it closely resembles from the cowl back. Even though it supports less weight on the XP-5 Bocar than it did originally, the VW suspension assembly used at the front of the "5" is beefed up by welding a chrome-moly rod into the center of one spindle and adding stiffening webs to the steering arms. It's been reliable to a fault.

### AFTER BIGGER GAME

Based on road and racing experience with all these cars, Bob Carnes has laid out the XP-6 with the express goal of challenging the current best in U.S. sports car racing—the Scarabs—on their own terms. Within his own special field, hillclimbs, Bob would like to win *overall* at the premier Pike's Peak event. In short, Bob recognizes no "unassailable" superiors in his realm of racing. As will also be obvious from the XP-6's specification, he has only contempt for most "class" racing. All-out ultimate performance—linked with utility—is the objective.

For two reasons—greater stability and more powerplant space—the wheelbase of the XP-6 was stretched 14 inches to 104 inches. There's room under the hood for just about any engine. A hot Pontiac was originally slated for the proto-





type car, but a Chevy was finally installed when quick preparation for the 1959 Pike's Peak event was called for. Like all Bocar frames, that of the XP-6 is a deep, satisfyingly rigid structure. Its neatly trussed tubes wind above, below and around the passengers and components in a way that confers an of-a-piece feel on the Bocar that inspires immense confidence. Three sizes of 4130 tubing are used, the biggest being 1½-inch diameter with .072-inch wall. Others are 7⁄8 x .035 inch and ¾ x .035 inch. With paint the XP-5 frame weighed 154 pounds, increasing only 10 pounds on the "6" thanks to astute simplification.

#### SENSIBLE SHAPE

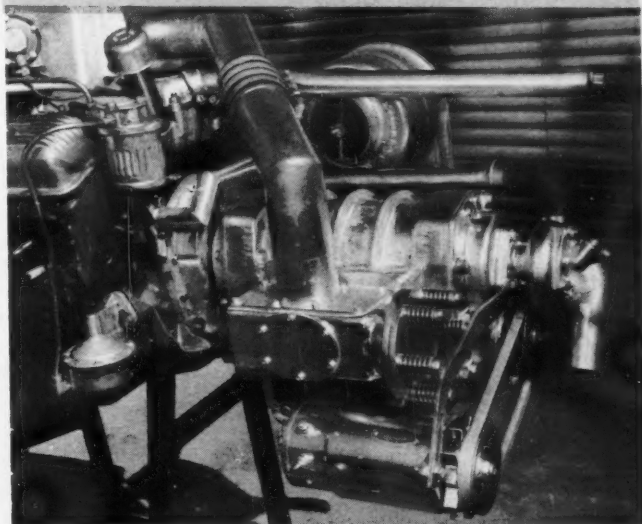
Frame rigidity is sufficient to relieve the fiberglass body of any important stresses. A major component of the Bocar project, this body was developed by Carnes with care proportional to the speeds at which his cars must be dead stable. Conforming to aerodynamic principles which dictate that the maximum cross-section of the shape should be well to the fore, Bob's Bocar tapers from 66-inch width at the front fenders to 60¾ inches at the tail. Internal airflow was given special attention, and models of the resulting shape were tunnel-tested on the West Coast. When driving and riding in the XP-6 I was impressed with the way air passed cleanly and smoothly over the low windshield and cockpit, the most difficult area to solve in an open sports car. When the XP-5 body was judiciously stretched through the cowl section to fit on the XP-6, Carnes feared that the stability would not be enhanced, but at over-100 speeds it certainly felt fine to me.

Bocar body-building facilities are excellent. Supported by a network of tubing, the female mold is mounted in a huge arch on gimbals that allow it to be swung to any position to facilitate layup. Basic body paneling is two layers of fiberglass cloth backed up by one layer of mat. Separate molds are used for the body and for the cockpit which, for the XP-6, would weigh 95 and 35 pounds respectively. Epoxy resins are used only for strengthening of edges, etc., not for attachment of the body to the frame. The latter is neatly done by wrapping fiberglass strips around frame tubes wherever (by plan) they're adjacent to the body. It's not necessary for the strips to adhere to the tubes; they hold merely by encircling them.

For the newest car Bob created some delightful seats of fiberglass, deeply bucketed to confer rigidity and to brace the driver laterally. This they do superbly, thanks to adroit foam rubber padding and neat upholstery. They're exceptionally light too. Also in the offing is a hardtop for all

(Continued on page 54)

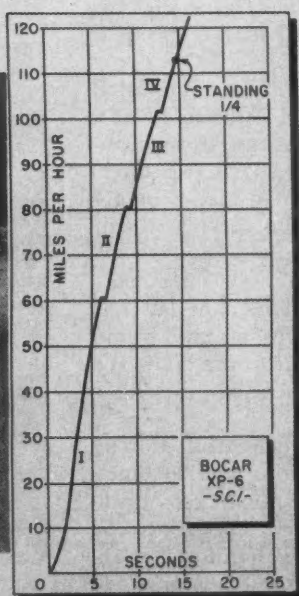
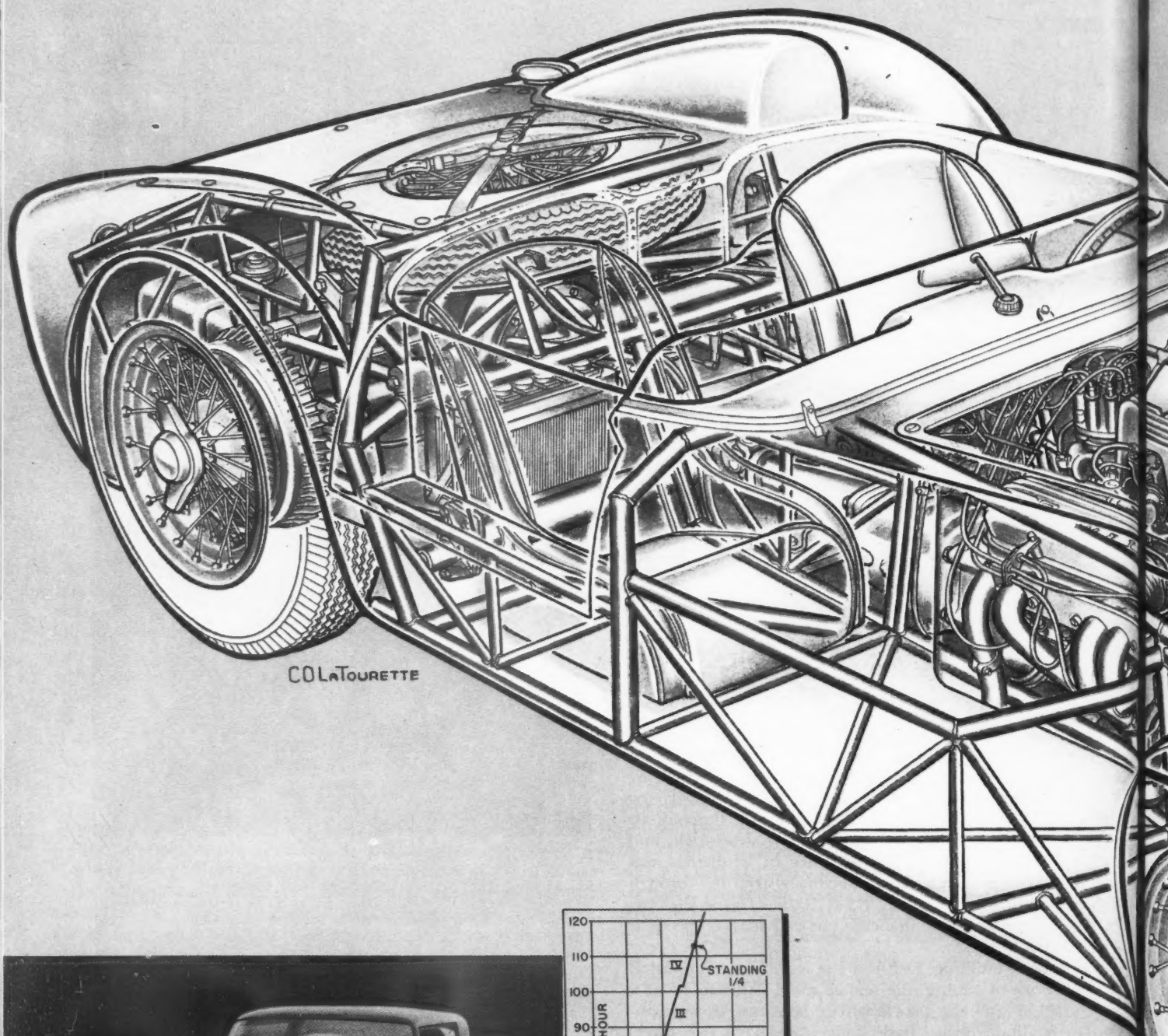
Bob Carnes designs, builds and drives the Bocar. His strong initiative saw the project through and keeps it on the move on the race tracks. At upper left he checks out performance with mechanic Lee Marshall at Continental Divide Raceways. Headlight covers can be removed if state law requires. Carnes ponders knotty clutch linkage problem above.



Blower installation uses blowoff valve, chain-type coupling from Polvin kit. Unusual mounting of water pump and generator solved difficult accessory drive problem. Still in formative stage is fiberglass hardtop for all Bocars, with recessed rear window to clear headrest/roll bar. Entry poses a real problem. Price will be in vicinity of \$450 complete.



BOCAR XP-6 "hurls itself forward with an effortless violence at any speed and in any gear."





# TECHNICAL REPORT

## BOCAR XP-6

Price .....\$11,700  
 Manufacturer...Bocar Mfg. Co.  
 1240 Harian St.  
 Denver 14, Colorado

### ACCELERATION:

(using only 6000 rpm)

From zero to	seconds
30 mph	3.3
40 mph	4.1
50 mph	5.0
60 mph	6.0
70 mph	7.6
80 mph	8.8
90 mph	10.7
100 mph	12.1
110 mph	14.2
120 mph	16.0
Standing ¼-mile	14.6
Speed at end of quarter	112 mph

### TOP SPEED:

(Assuming 7500 rpm) ....167 mph

### SPEED RANGES IN GEARS:

	6000 rpm max	7500 rpm max
I	0-61	0-76
II	13-81	13-101
III	17-102	17-128
IV	22-134	22-167

### POWER UNIT:

Chevrolet V8 with GMC 4-71 supercharger  
 Bore & Stroke.....3.875 x 3.00 in  
 98.4 x 76.2 mm  
 Displacement...283 cu in—4640 cc  
 Compression Ratio.....9.5 to 1  
 Carburetion by....Rochester fuel injection  
 Power.....400 bhp @ 6200 rpm  
 Usable rev range...1000-7500 rpm

### GEAR RATIOS:

Gear	Ratio	Overall	1000 rpm Mph per
I	2.20	8.14	10.1 61
II	1.66	6.14	13.4 80
III	1.31	4.85	17.0 102
IV	1.00	3.70	22.3 134

### CHASSIS:

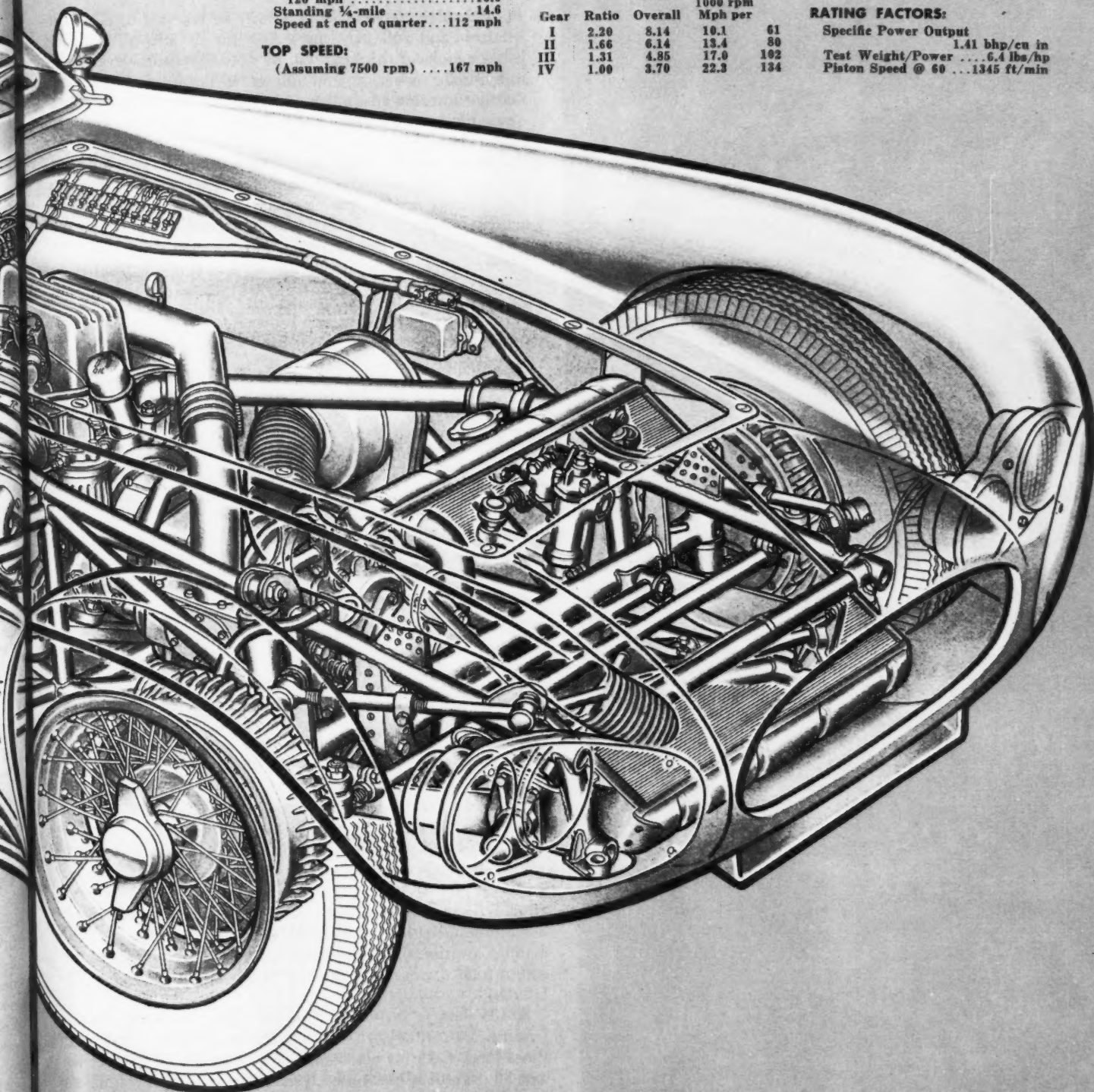
Wheelbase .....104 in  
 Tread F. R. ....54, 52 in  
 Suspension, front and rear rigid axles, paired trailing arms, torsion bars  
 Shock absorbers.....Adjustable Gabriel or Monroe  
 Steering turns L to R.....2½  
 Brakes .....12 in Buick drums  
 Tire size.....6.00 x 16 front  
 6.50 x 16 rear

### GENERAL:

Length .....170 in  
 Width (60 @ rear) .....66 in  
 Height (with top) .....43½ in  
 Curb Weight (full tank) 2290 lbs.  
 Test Weight .....2570 lbs.  
 Weight distribution .....50/50  
 Fuel Capacity 17 to 31 U.S. gallons

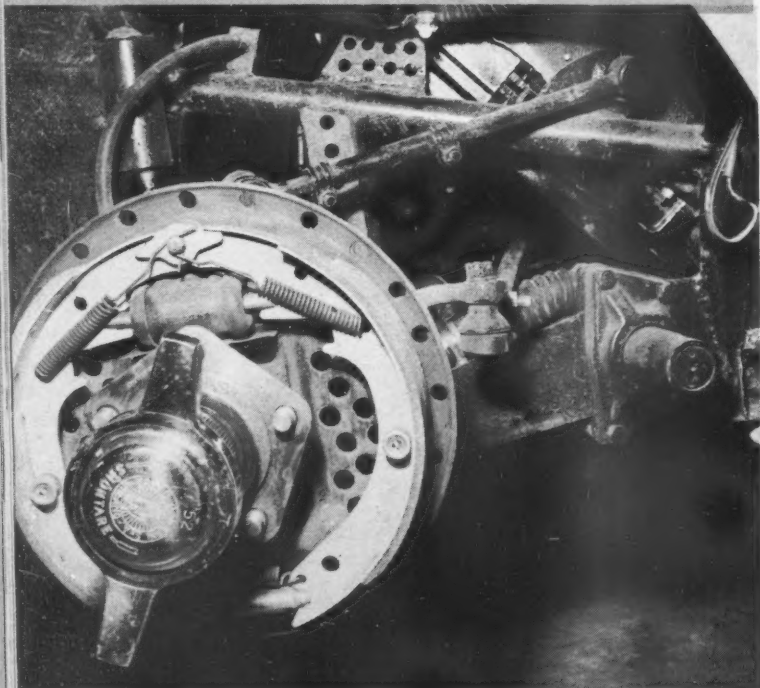
### RATING FACTORS:

Specific Power Output 1.41 bhp/cu in  
 Test Weight/Power ....6.4 lbs./hp  
 Piston Speed @ 60 ...1345 ft/min





Under-the-hood view in XP-6 Bocar is spectacular. Extreme length of engine-blower package is accommodated by 14-inch increase in wheel-base length. Wiring and piping are handled with commendable precision here. 1959 Buick brakes are mounted on drilled '54 backing plates. Tubular beam axle is controlled by parallel trailing arms, the lower arm-plus-torsion bar being adapted from that used in Volkswagen rear suspension.



54/SPORTS CARS ILLUSTRATED/JANUARY 1960

Bocar models. Its rear window will be recessed to clear the headrest and roll bar which Bob builds into all his cars, but some clever thinking will be needed to allow even agile individuals to get in and out of a hardtopped Bocar. A massive interior advantage is leg room that would be adequate for a seven-footer. The pedal positions can be changed to suit you. .

Carnes faces a hydra-headed situation in the building and sale of separate Bocar bodies. These well-shaped shells find a ready market among special builders and are a convenient source of capital for Bocar Inc., but there is the ever-present danger of a proud purchaser of an \$8700 XP-5 encountering a low-budget special sporting an ill-finished body identifiable by the casual observer as a Bocar. It can be deadly to the reputation, and is not at present being done.

#### MORE BITE IN FRONT


Particularly in America, where courses are smooth, racing today tends to indicate that solid, beam-type axle arrangements are fully as good as independent suspensions for competition use. Independent layouts are invaluable for racing over bumpy surfaces (ask Ak Miller about the Mille Miglia) or for providing a good ride in a touring car, but lately the old solid axle has been making a strong comeback among those designers who use what *works*, not what looks good. Bob Carnes, being practical above all, chose a solid front axle located Kurtis-fashion when it became evident that the VW arrangement didn't give the sheer "bite" needed for successful short-track competition. On smooth roads and tracks it can't be faulted.

A straight tubular front axle takes '54 Buick steering knuckles and spindles arranged to give one degree of camber and *no* kingpin inclination. Bob wanted very light steering without the car-lifting effect that inclination gives, and, since he was racing largely on smooth tracks, was willing and able to accept the kick-back in the steering wheel that would accrue.

The axle-locating parallel trailing arms are splayed outward slightly to provide adequate steering lock. Lower arms are VW rear-wheel blades, complete with torsion bars which are turned down to reduce their rate or stiffness. Lighter upper arms are screw-adjustable in length to control caster, which is now set at 2 degrees. Two inches of bounce and rebound are allowed at each wheel of the car, controlled by adjustable (road plus race ideal again) Gabriel shocks. Lateral location of the front axle is now by a long Panhard rod, which Carnes may replace with a Watt's linkage in later XP-6's.

A VW box is the nucleus of the steering system, which features a variable lock to facilitate the rounding of tight Pikes Peak hairpins when necessary. Bob's XP-6 was set to give 30 degrees of lock on each side, a very deep wheel movement which could be encompassed by 2 1/2-turns of the steering wheel. With the vertical kingpins and only modest weight on the front end, the XP-6 steers like the proverbial baby carriage. The steering wheel can be used to aim and





direct this car without conscious effort being required to wrench it around. Excellent road "feel", on the level required by the racing driver (accurate indication of the amount of traction available at the front tires) is provided by the modest caster and large tire contact patch offset. Off the track and over bumps there is a fair amount of wheel kickback of an order that could be controlled by a judiciously placed damper, if the owner were unduly sensitive.

### REAR TRAILING ARMS

A Chevrolet rear axle is now fitted in place of the Spicer unit used in earlier Bocars, to allow quick ratio changes without removal of the whole axle—a complication that necessitated removable frame sections in the Spicer-equipped cars. As a rule Bob fits the 3.70 ratio, though others could naturally be had. Limited-slip differentials were tried on the XP-5 but found to be harmful to handling and little aid to traction, so were not standardized. With more power, the stable-chassis XP-6 needs and uses Positraction.

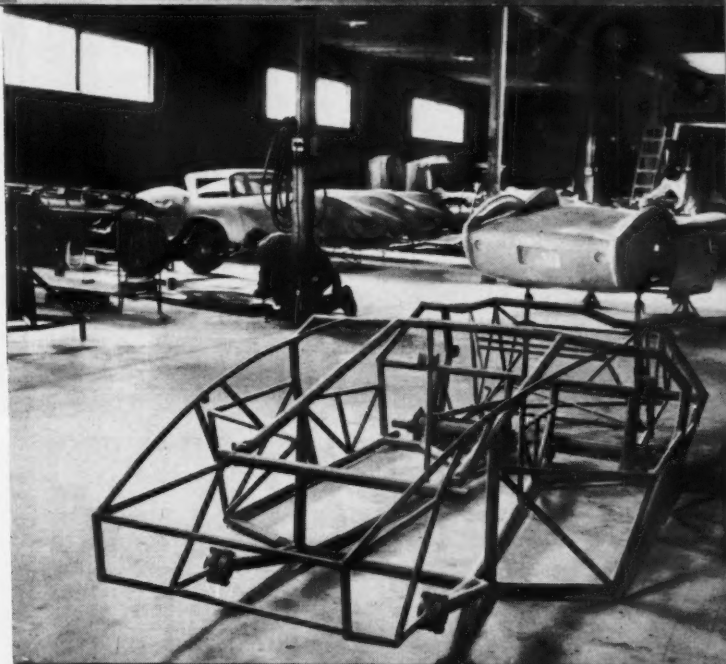
Again parallel trailing arms locate the axle, the lower arms again being VW blades-cum-torsion bars. Lateral placement is by a broad tubular A-arm on the same high plane as the upper trailing arms, giving a very high rear roll center. If anything the rear axle is over-located, with five separate members controlling its movement, but this is a real boon to Bocar's handling precision. It goes just where you point it, with no second-guessing from the back wheels. I personally have no experience of the XP-5 Bocar, but this XP-6 is astoundingly agile and easy to thread through tough cornering situations like those that cropped up at Continental Divide Raceway, where we wrung out the new car. With little driver effort the XP-6 devoured the serpentine of what has become known as a real Porsche course

### IT STOPS TOO

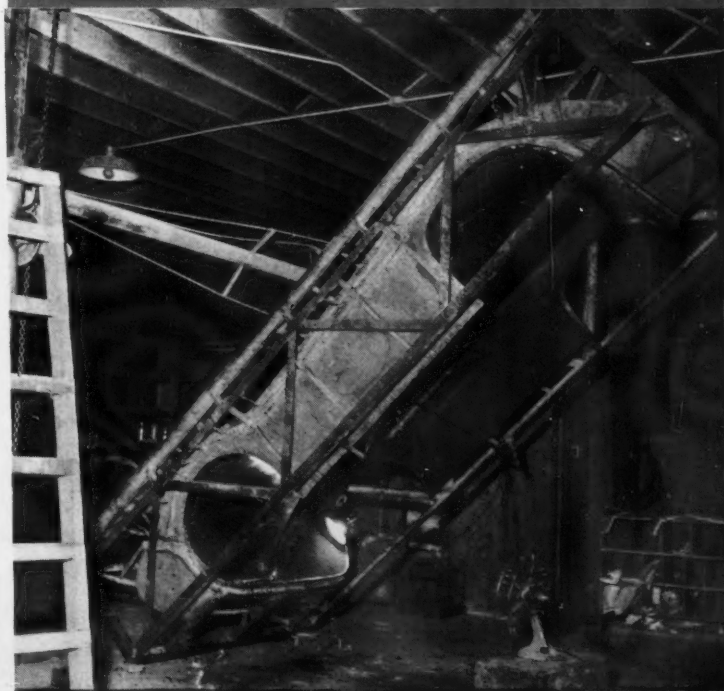
The lengthy XP-6 engine aggregate is placed as far back in the chassis as is practical, meaning that the Chevy block nestles close by the passengers' kneecaps. Once the engine's warm the cockpit walls tend to heat up too, a problem that's assuaged only slightly by reflecting aluminum sheets that have been placed along the engine's flanks. A distinctive Carnes Technique is the offsetting of the engine 1½ inches to the right to provide perfect lateral balance with only the driver aboard—for racing. Whether or not this was responsible I don't know, but the XP-6 was one of the few cars I've driven whose handling seemed to improve immensely when the passenger stepped out.

In this prototype Bob was using a '53 Ford gas tank, chosen because it's fitted with baffles in two planes. He plans a much larger 31-gallon tank of aluminum which, when laden, will bring the rear end loading much nearer the 58 percent he first estimated. With the driver aboard and a full tank the first XP-6 has about 52 percent on the back wheels. Invaluable to traction, this tail-heaviness also makes worthwhile the use of 12-inch Al-Fin Buick brake drums at all four wheels, the only concession to the preponderance of

(Continued on page 78)



Frame of XP-5 Bocar, in foreground, has been much simplified from this early example. Ample size of Bocar manufacturing facilities is evident, five XP-5's being under construction when this factory visit was made. Another kind of space frame is used to support the elaborate Bocar body mold. Lateral mounting pivot can be raised and lowered to position mold properly. Compressed air spreads sides open to allow easy body removal.



**Clean it once a month,  
Color it twice a year,  
It can remain new for years.**

**by Robert Lee Behme**

# How To: LEATHER CARE

Modern leather cleaners are three way in action. They clean, soften, and protect all in one swipe. New leather care products usually contain saddle soap, neatsfoot oil and beeswax. After cleaning (right) leather can be shined with a neutral shoe polish—or stained with a colored polish.

► According to the guy behind the butcher's counter, no matter how you slice a cow it comes out steak. But the men who are most concerned with the wrapping which neatly covers the steaks say it's not the steaks but the cowhide which is most important. If you've ever owned a sports car you probably believe them.

It is the cowhide which becomes leather. Once you've settled down into leather you know there is nothing better. It has long been the symbol of luxury and elegance. It is soft, supple and sensible. With care it can outwear chassis, engine and owner.

Back in the days of the classics—the mighty Duesenberg, Mercer, Bentley and Bugatti—leather became a popular luxury for the auto. According to the Tanner's Council of America, leather has been getting better over the years: more sensible, supple and serviceable. Today's leather, experts say, can last twenty to forty years if it is given proper care.

"I'd love to take care of my leather seats," one sports car owner said, "but it's more difficult than pulling plugs."

Like so much of automotive maintenance, the truth is hidden behind a billowing cloud of hocus-pocus. The truth is this: leather care is the simplest you can give your car. There are several ways you can take good care of your car's leather appurtenances. Any one of them is good. We'll outline them all, but no one treatment will work unless you do



# 1





it with regularity. Leather demands scheduled maintenance.

There are only four treatments recommended for leather: saddle or castile soap, neatsfoot oil, beeswax and lanolin. Just as leather has improved over the years, the maintenance procedures have also improved. In the glory days of the cavalry it was a laborious combination of saddlesoap, neatsfoot oil and beeswax which made the leather trappings of the corps so famous. A soldier, at the end of a day's ride, would drag his saddle to a nearby rock, work up a frothy lather with saddlesoap, wipe it on—with plenty of elbow grease—then wipe it off the same way, apply a coating of gummy neatsfoot oil and wipe it off, then apply beeswax and polish until the leather glistened like the bald head of the colonel.

If today's sports cars demanded this ritual to maintain leather there would understandably be few concours winners. But this procedure is as dated as the cavalry. There are prepared solutions which contain these three ingredients in one compound. They clean, soften and protect leather in one quick operation. One such product, Leather Kleen, produced by Tanner Products Corporation of Los Angeles, removes grime, restores the natural oil and polishes to a shine in a few minutes.

These solutions are best when applied with a brush. A nail brush will do the job. Apply a small amount of the solution to the bristles and brush the leather until a lather

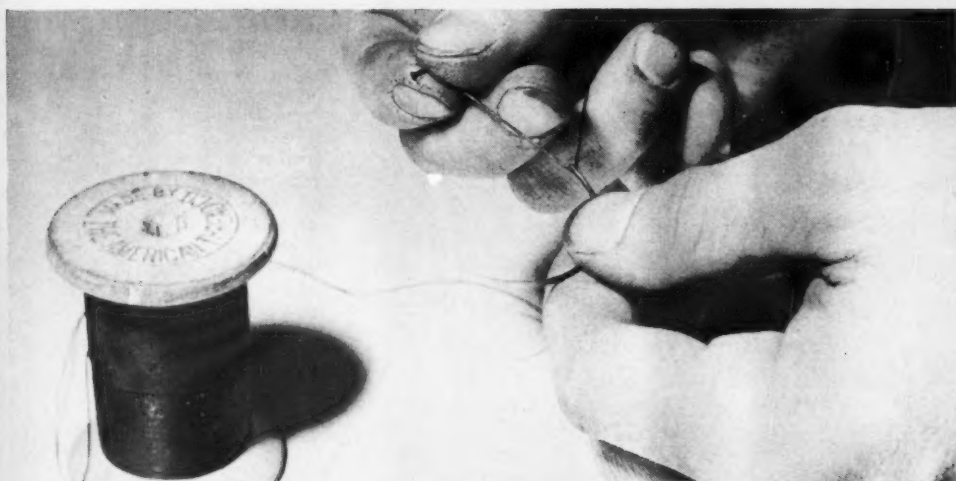
forms. With a sponge or rag wipe away the lather. The lather lifts the dirt from the leather and holds it in suspension. When the surface is wiped the dirt is removed.

Only the saddle soap in these solutions foams. After wiping, the oils and waxes remain. The neatsfoot oil is absorbed into the leather fibers. When the surface is polished, the beeswax in the mixture glosses and gives the leather new life while it forms a coating which helps keep dirt and moisture from working in.

Leather can be cleaned with saddlesoap or a gentle castile soap. Lux will also work. The soap should never be applied in a heavy water solution. Water is an enemy of leather: it will weaken the fibers causing the leather to stretch and lose tensile strength. Water can shorten the life of leather by 50 percent.

When leather is to be cleaned with soap, moisten a rag or sponge and work a small quantity of soap into it. Work the soap on the leather 'til it forms a lather. Wipe the surface clean with a moistened sponge; the dirt will wipe off.

Excessively dry leather can be softened by the use of oil. The natural oils are evaporated by sun, heat or moisture and to preserve leather this oil must be replaced at regular intervals. Perhaps the best method is the regular use of a prepared leather cleaner which contains neatsfoot oil as a part of its formula. Lanolin can be used but it is commercially available only in combination with leather dyes.



Pull thread through needle hole, then double back on stitch. Sew twice, once in each direction, smoothing leather as you go. When seam has been made tie thread under edging with square knot. Broken edging can be stained after sewing.



# 2

Never use a preparation which contains a solvent except when removing pigment. This can be more injurious than water. Leather, during processing, is colored by a pigmented dye which is absorbed into only a portion of the leather. The thin pigment layer is protected by a coating of either proxylin or Vinyl plastic. The coating is normally soft and pliable, but a solvent will dissolve the coating or, at best, render it a sticky substance which attracts dirt to form a muddy coating, leaving a dull glaze over what was once rich glistening leather.

The use of neatsfoot oil alone as a leather softener has been discouraged by every home leather restorer who ever tried it. Neatsfoot oil is tough to use. It is a sticky substance the consistency of maple syrup. Spread over upholstery a portion of it is absorbed; a larger portion sticks to the surface. It must be rubbed off before the seats become useable. Wiping off neatsfoot oil is a project best relegated to slave labor. Nothing but leather cleaner and elbow grease will take it off.

Beeswax is good for leather. It covers the surface with a protective coating which adds life and lustre to the proxylin or Vinyl coating, but most leather experts feel the application of a 100 percent beeswax solution is little more than a waste of time. The prepared solutions containing beeswax as one element in their compound can do the job with less effort—and they clean at the same time.

Restoring leather is a tougher job. There is nothing known to the leather industry which can bring seats back to factory condition once they have cracked, but there are two methods which can approach this goal. The oldest method is nearly identical to a shoe shine. With luck a sports car owner can find a wax shoe polish which matches the color of his upholstery. Wax polish is the only thing which will work—liquids are out—because only the wax polishes contain a stain coloring which will work into the pores of the leather.

Polish is applied to the upholstery, as it would be to the leather of a pair of shoes, then wiped off. Wiping, however, does not remove all of the pigment and wax which has been applied. To prevent clothing from becoming stained, it is necessary to wipe the upholstery with a leather cleaner. The cleaner will remove that portion of the stain which remains on the surface of the leather, but will not remove the stain which has been absorbed into the fibers. The seats can then be polished.

With the advent of the new plastics and aerosol mixtures a faster and perhaps more efficient method is possible. Products are now available which contain pigmented dyes, lanolin and wax neatly suspended in a spray. New color is sprayed into leather just as a car is sprayed with paint. The seats of a sedan can be restored in a matter of minutes.

During the exhibition of one such product, D'Elegance,

# 3



Broken seams can be restitched with a curved needle. Nylon thread (doubled, about 16 inches in length) is run through lump of beeswax. Wax protects, lubricates thread for easier sewing. To do seams use curved needle to get close to edging to hide hand stitching





an MG was treated—dash, seats and kick panels—in less than 45 minutes. The results were amazing.

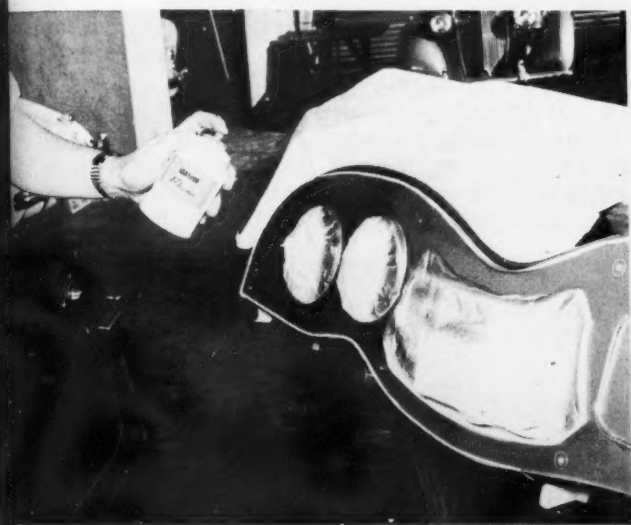
There are other products, similar in compound to the spray, which are designed to be applied with a brush. Most of these, too, are good. Leather products which contain pigments designed to be absorbed into the leather are good. They will restore a high percentage of the original lustre and coloring.

But there are products also on the market which are little more than a paint. The coloring and shine, built into a minute layer, are merely deposited on the surface of the upholstery. It forms a coating over the leather and as the leather flexes under normal wear these surfaces tend to chip and crack.

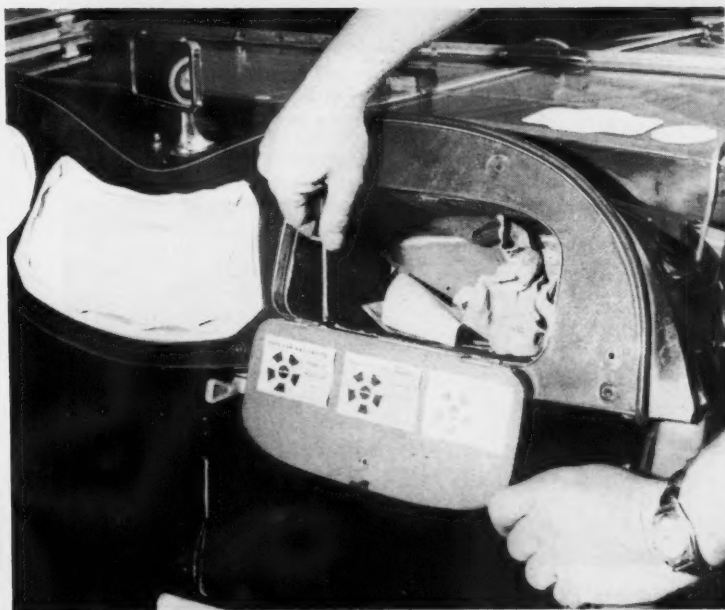
The restoration and maintenance methods outlined will do the job as well as anything, but nothing short of new material can restore the factory lustre once leather cracks. The cracks will absorb pigments at a different rate than the uncracked areas. The only way to avoid trouble is to take care of leather before it shows signs of wear. Cleaned once a month, re-colored twice a year, leather will retain its appeal for many years. Throughout its life it will remain soft and luxurious. Ten years from now it will be as good as the day you bought it.

—rlb

MG dash leather is sprayed with coloring material after chrome and instruments have been masked. One of the few times a solvent should be used is just prior to color spraying. Solvent removes proxylin or vinyl coating helping dye to penetrate pores of leather. Spray can (lower left) should be held about one foot from the surface. Before spraying leather-covered dash anything that is not to be colored should be removed or masked with paper.



# 4



# MONZA

# GP

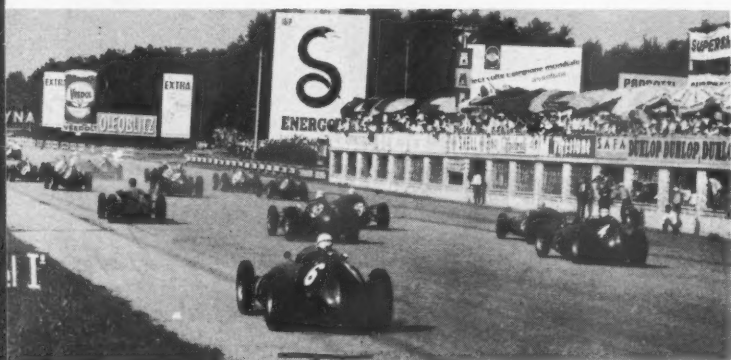
by  
Jesse Alexander

► It is now obvious that the Grand Prix car in its normal concept of front engine, rear drive, is on the way out. This change is coming about slowly, and for Ferrari, painfully. John Cooper, however unknowingly or unintentionally, started the trend—BRM have now joined and there is no doubt but that Ferrari will have a rear-engined car in 1960. The trend became doubly clear this year at Monza when during training the rear-engined BRM made its debut, and although there was no intention of starting the car in the race, the days spent in testing at Monza proved invaluable.

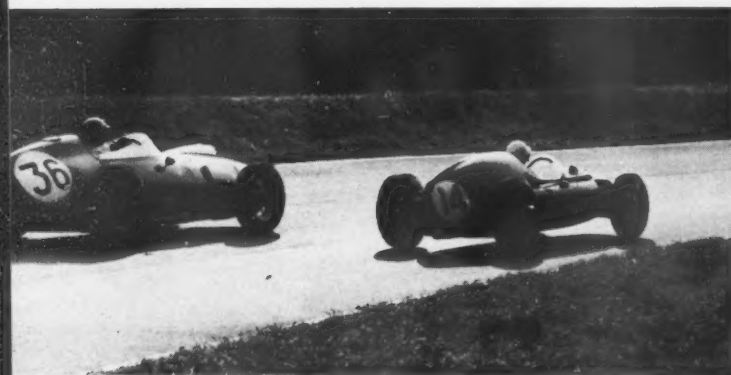
Four months from drawing board to track would seem to be a major tour de force for BRM; the new car looks more like the Porsche Formula II single seater than the Cooper. A regular four cylinder BRM engine has been mounted behind the driver's seat in an entirely new chassis that appears to be slightly lighter than the present one. The front suspension of the old car has been put into the new one, while Lotus-like independent single wishbone rear suspension is fitted at the rear. A BRM gearbox has been mounted behind the engine, the shift mechanism running forward to a lever at the driver's left. Fuel tanks are fitted

in both sides of the cockpit. When it was first seen, the new car's engine was breathing via a front mounted air scoop from which two flexible hoses ran back to the carburetors. The normal BRM braking system, including the single rear disc, has been carried over to the new car. Bonnier and Schell drove it in training and had good things to say about the handling. One of the several troubles at Monza was getting enough air into the carbs. The mechanics took off the flexible tubes for the second session of practice allowing the Webers to breathe as on the Cooper-Climax, but it was clear that the new car was still in a preliminary state of preparedness and that the BRM team had rushed the project in order to get it to Monza for testing. Naturally it could be a real threat in 1960 with a top driver although it was designed for the 1.5 liter Formula that comes into effect in 1961.

Only two days were set aside for official training at the 1959 Italian Grand Prix although Aston Martin, BRM and Ferrari had been out earlier in the week endeavoring to sort out gear ratios and handling questions. Carroll Shelby did over one hundred laps in the Formula I Aston on



Above: The start of the Italian G. P. Brooks, who started in the first row, has already been passed by seven cars.  
Below: Dan Gurney in the Ferrari tried for almost half the race to pass Moss for second position behind Phil Hill.



PHOTOGRAPHY: ALEXANDER



Tony Brooks is shown here during practice in the Ferrari.



Wednesday, never getting below 1'47", not a very competitive time considering that the previous year's training record set by Brooks in a Vanwall was 1'40.5". Friday it became even more obvious how the wind was blowing when both Moss and Brabham got below 1'41". Finally at the end of the day Stirling Moss broke the magic 1'40" figure, setting a new record of 1'39.7"—an average speed of 128.8 mph. Moss, driving the Cooper-Climax of Rob Walker, and Brabham, behind the wheel of the "works" Cooper, looked extremely at ease in the cars and even Bruce McLaren, at Monza for the first time, took the new circuit in his stride after Jack had showed him the proper line. McLaren was soon setting competitive times looking fully at ease.

By Friday afternoon and first practice all of the Ferrari team were assembled. Olivier Gendebien and Cliff Allison had been recruited at the last minute to back up the front line of Brooks, Hill and Gurney. Ferrari always makes a maximum effort for the Italian GP, with Enzo himself in the pits for practice. Prior to official training, one Ferrari had its front suspension altered raising the roll center. Phil Hill drove this car, did not like its behavior, and the project was given up. Ferrari was also playing about with the rear roll centers by altering the position of the locating block on the de Dion tube. All of the engines were of the "246" type while the chassis were identical except for the car driven by Gendebien, which was the short-wheelbase one Behra drove at Zandvoort. By the time first practice period had ended, all the Ferrari drivers had done fast laps. Cliff Allison in particular being the first to get a really quick time. But Gurney, Hill and then Brooks were soon in the groove.

We watched part of the practice session at Lesmo; also on hand at that corner was former Lancia designer Jano, presumably observing the cornering behavior of the Ferraris, for he has been working with the Scuderia in an advisory capacity for some time. The Ferrari problem was again too much understeer and not once in the two days before the practice session were they able to arrive at a suitable chassis setting to make the car agreeable to the drivers. Brooks finally broke 1'40 in training but naturally with a light load of fuel on board. As training finished it was obvious that the Coopers were far from being a toy to be scorned, even at Monza, and when the cars from Surbiton actually won the race on Sunday, it came as no surprise to any one, the Italians included. This race made history.

In the front row of the starting grid were the three contenders for the 1959 Driver's Championship: Moss and Brabham with Brooks between them in the red Ferrari. As the flag fell, the two Coopers surged forward while the Ferrari remained stationary momentarily, a huge cloud of bluish smoke coming from behind. Brooks had cooked his clutch on the grid, managing to get under way, but red hot bits fell off before he reached the end of the straightaway. Coming out of Lesmo corner, Phil Hill passed Moss to go into the lead while Gurney lay third. So the order remained for the better part of the first half of the 72-lap race. Gurney drove terribly hard trying to pass Moss coming out of the south turn several times but the Ferrari just could not get by the Cooper, obviously lacking steam. Hill stayed in front until the 30th lap when he was given the flag and brought into the pits for a tire stop. On subsequent laps each Ferrari called at the pits for new tires while neither of the fast Coopers were forced to change, though they did slow Brabham down because of rapid tire wear. Gurney lost third slot to Brabham because of the tire stop but, try as hard as he could, was unable to overtake Jack. After McLaren's car threw a rod he was able to come to rest at the end of the back straight, going right on up a bank.

It's difficult to say whether the Ferraris could have gone the whole distance without a tire stop. Most probably they might have but only at a reduced speed, and it was suspected that had Brooks gotten off to a good start, he was to try and



Top: Olivier Gendebien, who started sixth and finished sixth, gets tires. Above: As further indication of the trend toward rear engine location, BRM brought their new car out for practice. Sufficient carburetor air was a problem, solved somewhat by external tubes running from the front scoop.

go the whole way on the same set of Dunlops. Our only other comment would be that there's certainly a lack of imagination in Ferrari team tactics—for as soon as the red cars called at the pits the race was to all intents and purposes over. They should perhaps have let Hill go longer before flagging him in. His performance was certainly welcome at the end of what has been a not-too-hot season for the Californian. He managed to hold fastest lap, turning a 1'40.4" on his 32nd lap, averaging 206.1 khp or 127.7 mph, repeating his previous year's success in that respect.

If Jack Brabham wins Sebring he will be assured of the title of World Champion, but if Moss wins, Jack must finish at least second. Brooks is still in the picture, of course, but after witnessing these two successive victories by Moss in Rob Walker's Cooper-Climax it is hard to see how he can keep from being victorious at Sebring as well. The Cooper with the five speed Colotti gearbox is now as reliable as a train, and almost as easy to drive. The Ferrari drivers work extremely hard while the Coopers seem to tour around and one's impression of Monza was that Moss was simply playing with the two Ferraris, knowing full well that they would have to have new rubber. He could easily afford to lie second for the opening half of the race.

—jla  
Official Results: 1959 Italian Grand Prix, September 13th at Monza.

1. Stirling Moss (Cooper-Climax) 2 hr, 04'05.4", average of 200.177 kph, or 124 mph.
2. Phil Hill (Ferrari) 2 hr, 04'52.1".
3. Jack Brabham (Cooper-Climax) 2 hr, 05'17.9".
4. Daniel Gurney (Ferrari) 2 hr, 05'25".
5. Cliff Allison (Ferrari) 2 hr, 04'18", 1 lap behind.
6. Olivier Gendebien (Ferrari) 2 hr, 05'37.9", 1 lap behind.

**A thousand things can go wrong  
— in an agony of suspense  
you wait while the minutes turn  
into hours, the hours into days  
and twelve hours is forever.**

► Twelve hours can go by like a flash. Twelve hours can also be an eternity. It all depends on your point of view. If your name is Alec Hounslow and you're watching a stubby little bronze-painted car, heavy for its 57 cubic inches of displacement, buzz full bore around a ten mile circle, those 12 hours can seem like forever.

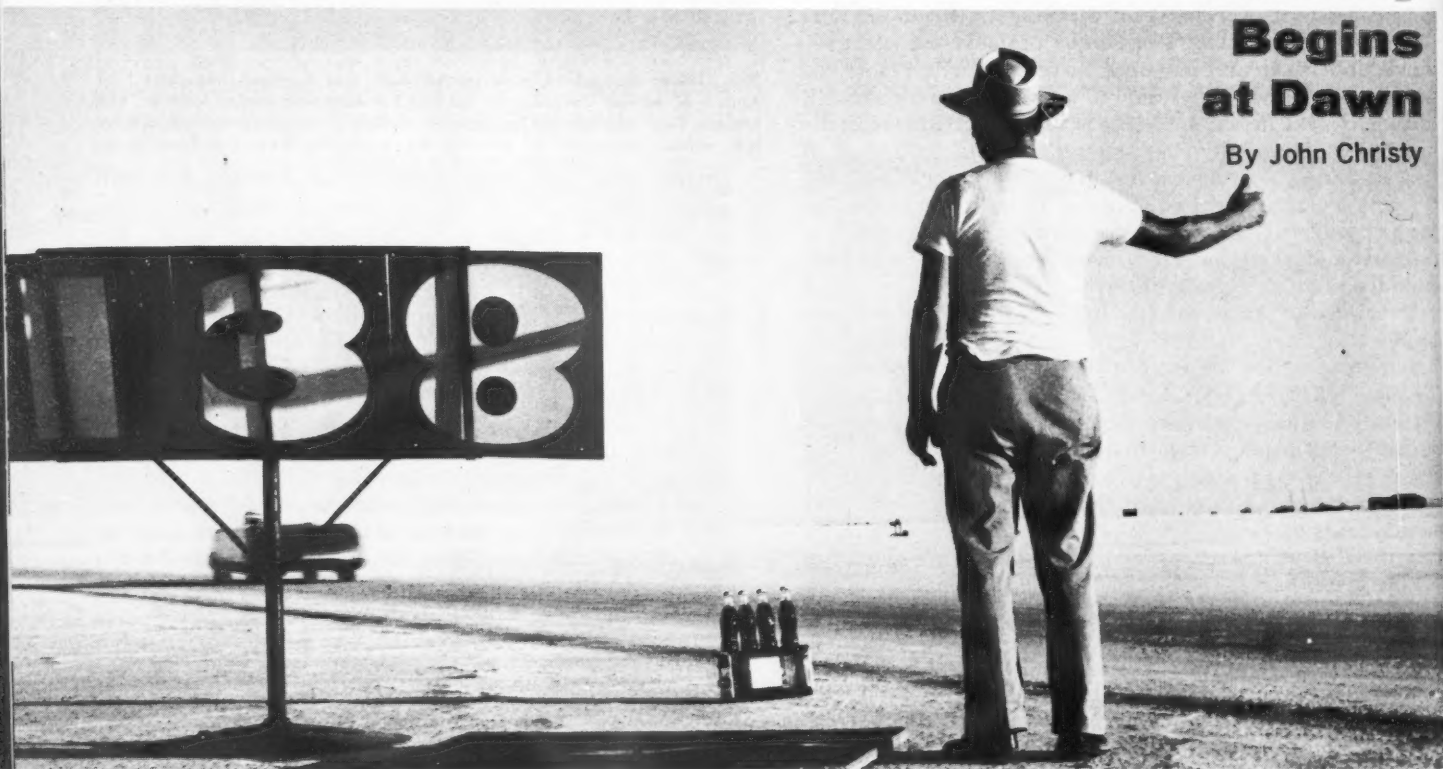
If your name is Alec Hounslow you have spent months putting horses, 70-odd of them, into the 949 cc's where only 35 had lived before. If your name is Sidney Enever you have spent months, along with your regular work, of dynamometer time and slide rule time figuring out just how much Alec had to get out of that engine to push 1700 pounds of car at 135 miles an hour or better for those 12 hours. And if your name is George Eyston you have spent untold hours sorting out a myriad of small and large details, arranging transportation, making lists and seeing that those lists were filled out with material goods, arranging living accommodations and getting a month's worth of use out of a sea of salt desert halfway around the world. You've done this in order that 22 crates and upwards of 30 people would all arrive at this desolate, sun-drenched spot at the proper time so that Alec's engine could push Sidney's car faster officially than it, or anybody else's similar car had ever gone before over that period of time.

Now that stubby little bronze car is out on the huge expanse of salt and one man, or rather one of three you've selected, is doing his level best to make the car do what you have planned it should do. Dazzled by a brilliant sun glistening on white salt, deafened by a thousand different mechanical noises and bereft of all sense of speed because of the total lack of anything to judge by, one man is trying to maintain the exact average speed you've told him to set. His job isn't easy either. That ten mile circle is as accurate and even as men could make it but it varies. Here it is as hard and smooth as new concrete but elsewhere along that ten miles of sheer white nothing it is bumpy or windy or wet and slippery. It isn't just a matter of poking a throttle until the tachometer reads 6000 rpm and holding it there. Nor is it just a matter of cranking a few degrees right lock on the steering wheel and holding. Those bumps and slippery spots, those gusts of wind all must be taken into account. Engine speed and steering lock must be varied time and again during each of those ten mile circuits and yet, if the car is going to do what it is supposed to the average speed must remain the same. Each lap must be made at some fraction between four minutes, 16 seconds and four minutes, 17 seconds—no faster, no slower. And it has to be done hour after hour for a full half day, mile after mile or a distance equiv-

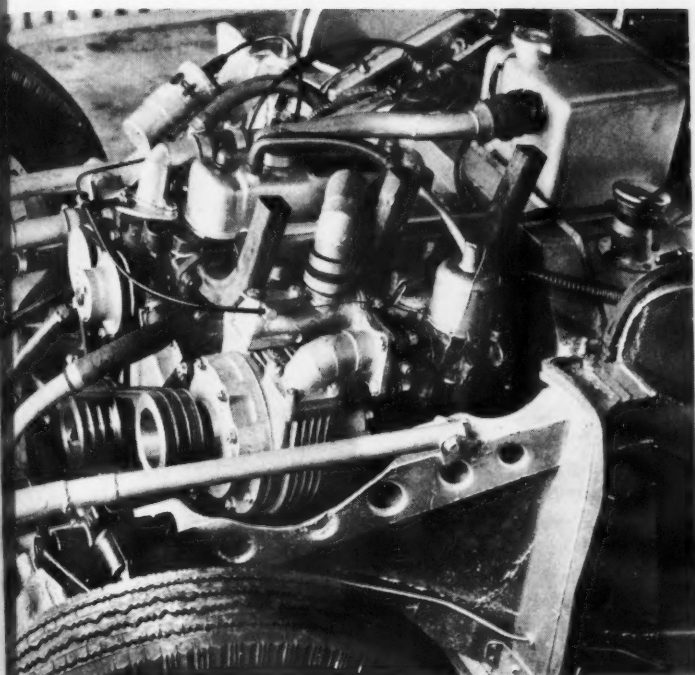
PHOTOGRAPHY: CHRISTY

## **Eternity Begins at Dawn**

By John Christy







Left: Tommy Wisdom brings the EX 219 across the line at the end of the twelve hours with a new record of 138.75 mph. Teetotaler Tommy was greeted by Coke instead of the traditional champagne. Signboard indicates speed of last lap. Top: Mildly blown Sprite engine has only standard BMC special tuning equipment: flat-top pistons, hard faced valves, cam and special-material crank. This was the engine used for the shorter runs and developed 99 bhp on fuel. Above: Ehrman brings the EX 219 into the shed after discovering clutch slip. Right: Enever, partially hidden at left, Hounslow with back to camera, Ehrman and Captain Eyston decide to replace the entire clutch assembly with the one from the 12-hour engine. Mechanic at right knows he'll be up all night . . . again.

alent to half the breadth of the United States.

If your name is Hounslow, Enever or Eyston you know all this because you've seen it all before. You know that a couple of ounces of inadvertent pressure on the throttle can blow that little engine sky high or that a sudden slick spot can allow wheelspin with the same effect. Those bumps can cause a tire tread to separate. A gust of wind could send the car into a quick series of spins which at the very least would drop the average or negate the chance of a record or at worst wreck the car. You know that any piece of metal has its fatigue point. You know a thousand things that could happen and everyone of them trudges or flashes through your mind. You know all this and so you sit and sweat.

For Eyston, Enever and Hounslow, eternity began at dawn September 9, 1959. It began when Tommy Wisdom, a British motoring writer and driver punched the starter button on EX 219, setting a mildly supercharged Austin Healey Sprite engine into stuttering life, dropped the car into gear and buzzed off on the first lap of the 160 trips around the big circle.

The first worry was wind. Cold and thin, it came in gusts of four to ten miles an hour. At dawn the salt is damp with surface moisture. Wind plus slick salt could mean trouble but Tommy's standing lap was 120 mph. His second was 140. His third lap was down to 135. Up went the signal board with the broad arrow pointing upward: "faster." The next lap was 139 and succeeding laps were between 140 and 138. The first National record fell in under five laps at 50 kilometers. In rapid succession came the 50 mile, 75 mile, 100 kilometer, 100 mile and 200 kilometer records. Then came the first big one, the International 200 mile mark at 138.15 mph. Within the first three hours 12 National records had dropped. As per instruction he cut the switch and went into neutral at the nine-mile mark and coasted for the pits. He came in hot, coasting at over 100 as he passed the timing lights. Moving fast, lacking any means of knowing his speed except that he was moving too fast he shot a hundred feet past the pit on the outside. Shoved back by the willing crew he hopped out. Gus Ehrman was up next.

"Mind the wet spot at Post One — and it's still bumpy at Three," Tommy had time to shout before Hounslow buttoned Gus into the now-refueled car.

Ehrman poked the button and was off. The pit stop was so quick that the average had dropped only a mile an hour to 138.85, the speed at which the National and International 500 kilometer mark fell — on Ehrman's standing lap. The 120 mph standing lap cut the average still further but only to 137.72 at the National and International 500 mile mark.

Now began the agony of waiting. The first major mark needed and sought after was the six hour point which stood at 132.13. One miniscule goof could cost the time that

(Continued on page 98)





The TS is a bella sedan. Recent minor changes spruced up the straight-forward, basically simple shape, making it pleasantly attractive.



All Isabellas, sedans, coupes and station wagon, share this drive train. Front suspension has own sub-frame. Rear end uses swing axle layout. Below is SCI's European Editor's Isabella Combi (alias Station Wagon). A 1957 model, it shows clearly what changes were made at the front.



64/SPORTS CARS ILLUSTRATED/JANUARY 1960

## ROAD TEST

# Borgward Isabella TS and Station Wagon

► Germany's Autobahnen may not be a highway engineer's idea of perfection, but to an enthusiast, wow! There's no speed limit, so when you're in a hurry you can go as fast as your car can carry you. SCI first saw an Isabella TS while cruising near Stuttgart at 4500 rpm in a locally made 1500 cc coupe. A small and at the time unfamiliar speck appeared ahead. It took a surprisingly long time to catch and turned out to be one of the then-new TS models. We were impressed that a six-passenger sedan could cruise nearly as fast as a highly streamlined sports model of exactly the same displacement. In fact, we're still impressed.

TS stands for Touring Sport; it relates to the ordinary Isabella (with 15 hp less) as any Detroitter with a Power Pack relates to its sister model without. To maintain smoothness at low revs, its twin-choke carburetor uses a progressively opening linkage. When correctly adjusted it enables top gear to pull from twelve mph, which corresponds to 700 rpm, despite a lumpy idle at about the same engine speed.

With a large body to push through the air, the TS is carefully geared to achieve its top speed at exactly peak revs (5200). The four speeds forward are close enough to enable third to be used up to 70, yet acceleration off the mark suffers but little. The TS doesn't burn rubber, yet it doesn't dawdle.

Fuel consumption is good and the high axle ratio (numerically low) helps. During the most brutal flogging: 21 mpg. Slamming the car down the highway and through city traffic, using lots of gears and revs and indicated speeds of 75 mph: 29. On the highway, taking it easy and staying under the legal limit or on it: 35.

Perhaps it's an exaggeration to call the Borgward a six-seater; as in the new "compact" Detroiters, four people find it spacious and six find it crowded. At least they're all inside.

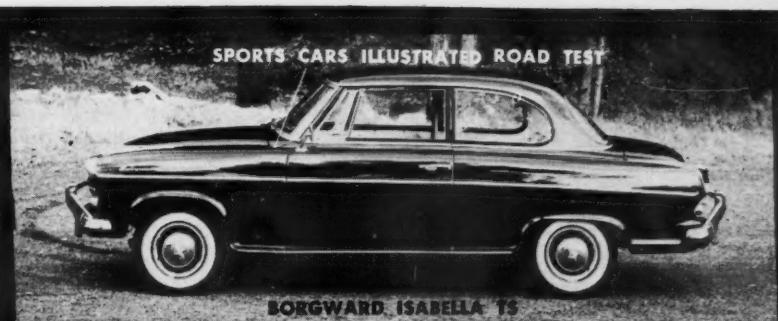


The smooth German styling wins praise. Window frames are neat and, lo and behold, neither they nor the doors nor the windshield leak. A high seat gives good visibility while the adjustable backs (standard equipment) provide a variety of positions. Also standard is artificial leather upholstery. A little handwheel at the corner of the seats operates the reclining mechanisms, turning the TS into quite a bachelor's lair. A bench seat, it moves backwards and forwards with ease, but offers no lateral support whatsoever in hard cornering.

Instrument panel layout is simple and straightforward, suffering only two shortcomings: the dashboard reflects badly in the windshield and there are too many knobs for them all to be unlabelled. Instruments are grouped below the horizontal bar-type speedometer (marked off in 15 mph increments), fuel gauge, water temperature, clock and odometer (including trip indicator). The glove compartment is small, but there are side pockets in the doors plus two more storage places on the side panels just ahead of the doors. The heater and defroster have separate controls for driver's side and passenger's, but no blower is fitted. (Unless it was one of those knobs...) (Ed. Note: It was.)

Pendant pedals operate the clutch and brakes hydraulically; the latter has the popular vacuum assist made by Ate in Germany. Both clutch and brakes are smooth yet strong. The clutch didn't slip and the brakes didn't fade. On the debit side, the throttle linkage caused criticism in that after full throttle had been reached, the pedal could be pressed further down as if the linkage were bending.

Column mounted shift levers have never been popular among sports car enthusiasts, especially when they have to control four forward speeds as well as reverse. The pattern is the conventional "H," with reverse engaged by pulling out



BORGWARD ISABELLA TS



Price .....\$2845

Importer..Fergus Imported Cars, Inc.  
1717 Broadway  
New York 36, N. Y.

**TOP SPEED:** (Bonneville) 97.1 mph

**ACCELERATION:**

From zero to	seconds
30 mph .....	4.8
40 mph .....	7.6
50 mph .....	11.8
60 mph .....	15.8
70 mph .....	21.0
80 mph .....	29.3
Standing 1/4 mile .....	20.6
Speed at end of 1/4 .....	69 mph

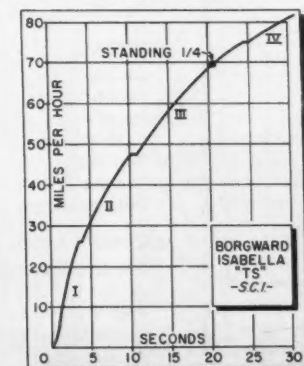
**SPEED RANGES IN GEARS:**

I .....	0-26
II .....	6-48
III .....	9-75
IV .....	13-97

**SPEEDO CORRECTION:**

Indicated	Timed
30 .....	27
40 .....	36
50 .....	45
60 .....	54
70 .....	63
80 .....	72
90 .....	81

**FUEL CONSUMPTION:** 21-33 mpg



**POWER UNIT:**

Type .....	In-line Four
Valve Operation .....	pushrod ohv
Bore & Stroke .....	2.95x3.32 in
	75x84.5 mm
Stroke/Bore Ratio .....	1.13 to 1
Displacement .....	91 cu in—1493 cc
Compression Ratio .....	8.2 to 1
Carburetion by .....	One Solex twin-choke
Power (SAE) .....	82 bhp
(DIN) .....	75 bhp @ 5200 rpm
Torque .....	84 lbs-ft @ 3000 rpm
Useful Range .....	700-6000 rpm

**GEAR RATIOS:**

Gear	Ratio	Overall	Mph per 1000 rpm
I	3.86	15.06	4.5
II	2.15	8.38	8.1
III	1.36	5.30	12.8
IV	1.00	3.90	17.4

**CHASSIS:**

Semi-monocoque unitized body-frame	
Wheelbase .....	102 in
Tread, F and R .....	52 1/2, 53 1/2 in
Ind. front susp., coil and wishbone	
Ind. rear susp., coil and swing axles	
Shock absorbers .....	telescopic
Steering .....	ZF roller segment
Turns lock to lock .....	4
Turning diameter .....	36 ft
Brakes .....	drums, 115 sq in area
Tire size .....	5.90x13

**GENERAL:**

Length .....	173 in
Width .....	67 in
Height .....	58 in
Curb Weight .....	2420 lbs
Test Weight .....	2740 lbs
Weight distribution .....	53/47
Fuel capacity .....	12.7 U.S. gallons

**RATING FACTORS:**

Power Output (SAE) .....	0.90 bhp/cu in
Test Weight/Power .....	33.4 lbs/hp
Piston Speed @ 60 .....	1910 ft/min
Braking Area .....	84 sq in/ton



SCI ROAD TEST

BORGWARD STATION WAGON

Price .....\$2685

Importer..Fergus Imported Cars, Inc.  
1717 Broadway  
New York 36, N. Y.

**TOP SPEED** ..... 81 mph

**ACCELERATION:**

From zero to	seconds
30 mph .....	7.1
40 mph .....	10.2
50 mph .....	15.6
60 mph .....	21.1
70 mph .....	29.1
Standing ¼ mile .....	23.3
Speed at end of ¼ .....	63 mph

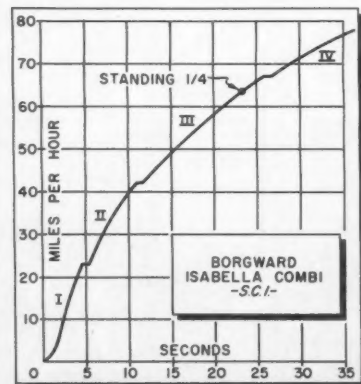
**SPEED RANGES IN GEARS:**

I .....	0-23
II .....	3-42
III .....	5-67
IV .....	7-top

**SPEEDOMETER CORRECTION:**

Indicated (kilometers/hour)	Timed
60 .....	60
80 .....	79
100 .....	98
110 .....	111
120 .....	117
130 .....	130

**FUEL CONSUMPTION:** 19-29 mpg



**POWER UNIT:**

Type .....	In-line Four
Valve Operation .....	pushrod ohv
Bore & Stroke .....	2.95x3.32 in
	75x84.5 mm
Stroke/Bore Ratio .....	1.13 to 1
Displacement.....	91 cu in—1493 cc
Compression Ratio .....	7.2 to 1
Carburetion by.....	One Solex
	single choke
Power (SAE) .....	.66 bhp @ 4700 rpm
(DIN) .....	.60 bhp @ 4700 rpm
Torque .....	.80 lbs-ft
Useful Range .....	400-5200 rpm

**GEAR RATIOS:**

Gear	Ratio	Overall	Mph per 1000 rpm
I	3.86	15.06	4.5
II	2.15	8.38	8.1
III	1.36	5.30	12.8
IV	1.00	3.90	17.4

**CHASSIS:**

Semi-monocoque unitized body-frame	frame
Wheelbase .....	102 in
Tread, F and R .....	52½, 53½ in
Ind. front susp., coil and wishbone	
Ind. rear susp., coil and swing axles	
Shock absorbers .....	telescopic
Steering .....	ZF roller segment
Turns lock to lock .....	4
Turning diameter .....	36 ft
Brakes .....	drums, 115 sq in
Tire Size .....	5.90x13

**GENERAL:**

Length .....	173 in
Width .....	67 in
Height .....	58 in
Curb Weight .....	2560 lbs
Test Weight .....	2900 lbs
Weight distribution .....	53/47
Fuel capacity .....	12.7 U.S. gallons

**RATING FACTORS:**

Power Output (SAE)	0.73 bhp/cu in
Test Weight/Power .....	43.9 lbs/hp
Piston Speed @ 60 .....	1910 ft/min
Braking Area .....	79 sq in/ton

and moving the lever towards you and up. While the test car's operated smoothly and easily, we have heard of several Isabellas which required strong muscles and a wide vocabulary. Apparently they take some "running in" if not precise adjustment. A bonus on the Borgward is that first gear is synchronized, making it fully useable in traffic.

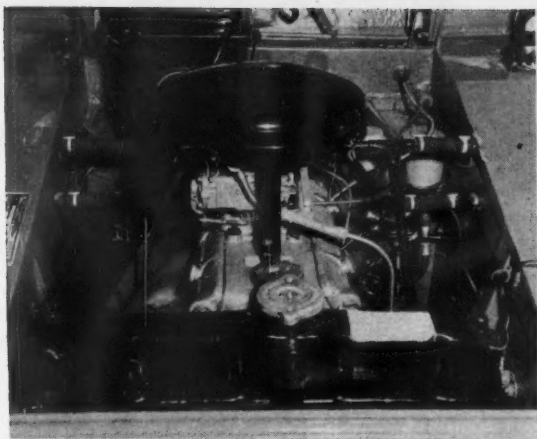
With separately mounted engine, transmission and coil spring-wishbone suspension at the front and independent swing axles with trailing arms and coil springs at the rear, the suspension layout of the Borgward is very similar to that used by Mercedes-Benz before the advent of the low pivot arrangement. In fact, many enthusiastic owners consider the Isabella to be a modest Mercedes, featuring solid German construction but lacking the luxurious interiors and, to a certain extent, the high price tag.

As always, the fully independent suspension shines most brightly on the worst roads. Any exit off the Bremen-Hamburg Autobahn will take you onto some of the most terrible secondary roads in all of Europe. One stretch consisted of a highly crowned single lane paved with cobblestones; on either side there was a two-inch drop onto the dirt shoulder which was filled with gigantic potholes. Whenever you met an oncoming car you both had to put your right wheels onto the shoulder. At 65 mph, this could be disastrous in some cars. With the Borgward, there was a slight jolt and then, spewing up a magnificent cloud of dust and stones, the Isabella showed how a real motor car takes care of itself in difficult moments. We flew over unbelievably large potholes that would have sent lesser cars out of control. The rear end broke loose once, but with only the slightest correction the car stayed on course. There was no sudden pitching or yawing. Even more interesting, no spine-wracking jolts or shocks.

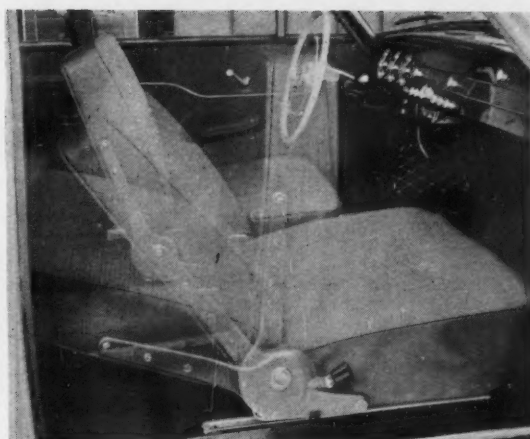
Depending on the load in back, the car's steering characteristics change from under-to-over- quite gradually considering the infamous reputation of "high pivot" swing axles. In testing on smooth roads, we found that on a particular bend the Isabella tracked at 40, hung out its tail at 45 and at 50 mph was sliding. It felt fine under all these conditions, but it should be pointed out that lower built sports cars do all these things about 5 mph faster. The reason for this change being so pleasantly gradual is that the rear end is rather lightly loaded. If you don't feel happy about having the rear end slide out a bit, you back off the throttle a little and it tucks itself in again. You can still give it the "Porsche whip" in tight turns, bringing the tail around in line with the front for the getaway down the straight.

When you release the safety catch for the hood, it jumps up quickly enough to hurt you with its very sharp edge. The pushrod operated overhead valves are adjusted through a panel in the cast aluminum rocker cover. Why not remove the whole cover? Because it incorporates the intake manifold and has the carburetor bolted on top. With a minimum of external manifold, the engine is very tidy looking. This neatness improves the access to such things as the dipstick (low on the right side), the oil filler (at the front of the rocker cover), the by-pass filter (at the rear) and





Four cylinder engine lies deep within body-frame side-panels, but access is good due to its clean and narrow arrangement.



Separate front seats are flat, high and widely adjustable. Twist knob replaces pull lever for reclining back rests.

the distributor (on the left side).

The trunk space is fine. It is opened by a pull under the rear seat arm rest. The spare tire and tool kit are kept under a false floor. Although all the luggage must be removed before getting the spare out, the convenience of a flat floor for the suitcases far outweighs the rare nuisance of a total unload. The bumpers are attractive but just plain optimistic for American traffic conditions and habits.

*Jesse Alexander, SCI's European Editor, and his wife Pat, caring little about such dreary problems as parking by ear and wanting an even larger trunk to cope with their growing brood (four—all girls) bought an Isabella Combi, the station wagon of the line. Living high in the Alps, the Alexanders probably give this particular "Borgie" a tougher thrashing than any other customer would—or could. His report follows:*

We just put 4000 miles on a new Borgward Combi, and the first general impression that should be passed on regards the ability of this automobile to keep up with everyday traffic. Bear in mind that the test was carried out in Europe, where there are far less highway restrictions than in the USA. We covered the distance between Bern and Paris, for instance, in a time not far distant from what we had done in a two-seater sports car of the same displacement. So, having disposed of this fallacy, let's look further at the Isabella wagon.

The Combi is powered by a de-tuned

version of the same 1.5 ohv four-cylinder engine as the TS. The 75-horse (DIN) engine is not available in the station wagon and Combi owners have to be satisfied with a 60-horse unit. With 400 pounds more avoirdupois, the Combi is crying for an Alexander or Raymond Mays conversion. But using the four forward gears and the four banger as a team gives surprising performance—a 60-65 mile per hour comfortable cruising speed with fuel consumption hovering about the 25 to 28 mpg figure.

The entire interior is done in washable fabrics, even the head liner. Experience with the family has proved the imitation leather upholstery and kick panels to be child-proof and dog-proof as could be. The rear passenger seat folds down into the floor and gives a loading area of just over five feet—not quite large enough to stretch out in full length, but still roomy enough to carry most of the paraphernalia that station wagons are destined to hold. The rear loading door is a one-piece, side-hinged unit that proves to be quite handy in actual use. However, a stack of lumber or an extension ladder would have to go on the large roof rack that can be purchased from Borgward dealers.

The hubcaps are frustratingly difficult to remove, requiring fifteen minutes each when trying to save the paint. We'd venture that the female members of the family would find it an impossible job to do.

The key starter is adjacent to the manual choke, and in below-freezing starts, only a slight amount of choke plus half throttle is

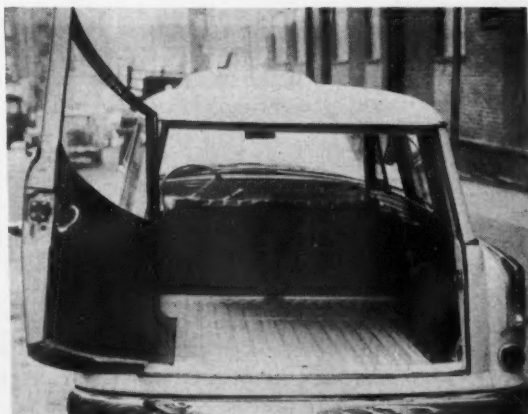
needed to get an immediate start and a quiet 400 rpm idle. On the open road throttle response is surprisingly good and the engine is vibrationless even at high speed. Cruising is comfortable anywhere up to 65; over that, engine and wind noise becomes noticeable.

We found the Combi very handy in corners—you could throw it in hard, and rear end breakaway was preceded by slight rear end patter. The car felt safe at all times. A slight bit of gear and rear-end whine was noticed, though it was not excessive. Cornering and steer characteristics change a bit if you load up with the family, but all in all, we found the car to be amazingly handy and maneuverable in tight situations, and with a surprisingly small turning circle.

In summing up the Borgward Combi, we'd recommend it to SCI readers who require a useful family machine but don't want to buy an ungainly, chrome-bedecked Detroit wagon. Though smaller, the Borgward has considerable space, perhaps all that a small family would ever need. It is perfect for running off to a race meeting, for the weekend or whatever. It's well styled in a simple, conservative way. If you respect sound construction and good handling, want a four-speed gearbox in a nimble and compact all-purpose car with a load limit of over a ton, then we'd suggest the Combi. If you want to sacrifice some of that load-carrying ability for a 0-60 time of less than 19 seconds and a top speed of over 90, then check into the Isabella TS.

—jla

Side-opening door is economical feature on Combi. Back seat folds down for flat, wide (55 in) and long (62 in) floor.



Isabella trunk is good-sized but counter balanced lid opens too little, making it hard to load up. Tool kit is standard.





PHOTOGRAPHY: THE MOTOR

# MONTE CARLO

► Alfred Théodor, a Paris newspaperman of the early thirties, was a gregarious type. Just give him *fraternité* and, as far as he was concerned, you could stick *liberté* and *égalité* up your dirndl. The entry Alfred filed for the 1931 Monte Carlo Rally testified to his bent for togetherness. Not so much a crew as a congregation, his codrivers numbered twenty, not counting the chef they'd chartered. Choosing one of the shorter and easier itineraries (there were 57 starting points to pick from back then, compared with nine today), M. Théodor and his friends motored serenely to Monaco in a 25-posto bus. The rally regulations of the period, a honeycomb of loopholes lightly held together with verbiage, were not only unspecific about the *kind* of car you could use — it didn't necessarily have to be a car at all; but nobody had realised this until hail-fellow Alfred established his historic precedent.

Twenty-nine years ago the rally organisers "aimed at being interesting rather than exact", as counselled by Voltaire. The sinister word "homologation" hadn't yet infiltrated the International Sporting Club glossaries and an entrant could dash off the entire paperwork preliminaries in less time than it takes his 1960 successor to decide whether his equipment answers to the definition of a standard touring car or a modified touring car or a special touring car or a standard Grand Touring car or a modified Grand Touring car.

Nonetheless, there were limits to the leniency of the old-time rules. For instance, shipping a car and a crew to Monte Carlo by train, or even part of the way, was out. This unwritten prohibition recalls the case of Jaques Bignan (Fiat), who created a sensation in 1931 by being the first competitor in the rally's history to reach the finish along the dreaded Athens route. True, he'd been five minutes late at an intermediate control, which ruled him out as far as any official award was concerned; but considering seven prospective Athens starters hadn't even made it to Athens, with all the time in the world at their disposal, and the rest of this route's

contingent (Bignan excepted) never saw which way Bignan went, the Frenchman's moral victory seemed indisputable. Aside from any other obstacles, and there were plenty, the notorious Pharsala to Larissa quagmire should in theory have swallowed the heavy Fiat (it weighed 2½ tons all up) beyond hope of exhumation by the ox teams customarily operating there in the rally season. Pre-1931, the record for a crossing of this ooze ocean, a distance of thirty miles, stood at five hours flat.

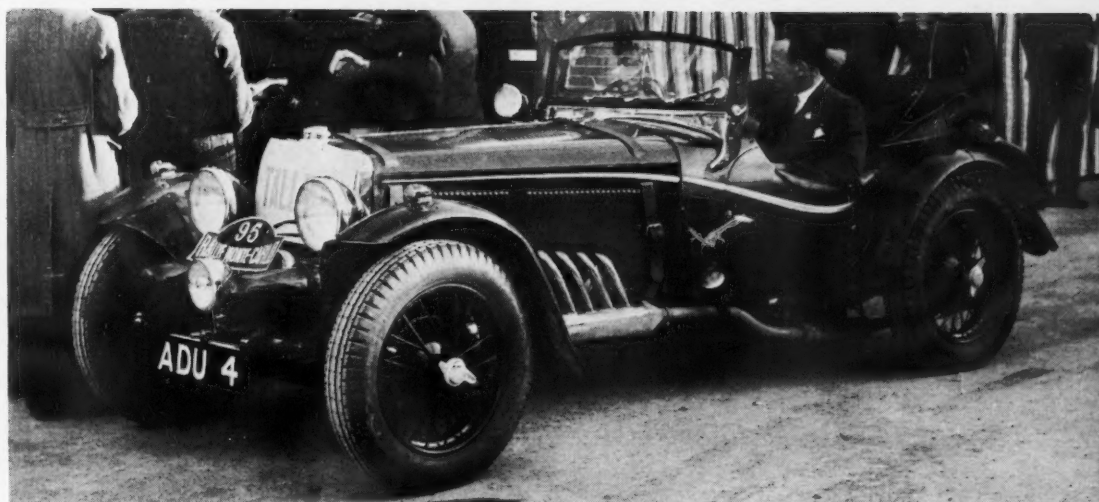
With Bignan disposed of, Donald Healey, who'd brought an open bodied Invicta from the frozen wastes of Norway, won the 1931 event. But his fellow British contestants, true to a national tendency to make as much ado over a rival's gallant failure as a compatriot's gallant success, were weeping pro-Bignan tears into their here's-to-Healey champagne. Almost before the last strains of God Save the King had died away they were pooling their spare pounds to buy a silver salver as a consolation prize for big Jaques. The final twist to the story, though, was this: by the time the memento was wrought, inscribed with the donors' signatures and ready for presentation, reports that Bignan had railroaded himself, his crew and his Fiat part of the way from Athens were gaining circumstance and credence. Some of the tray fund subscribers believed it too. On balance, however, they decided it was still a rugged exploit, hitch or no hitch, and the presentation duly came off in an atmosphere of mutual cordiality.

When at last the Athens route was decisively licked, in 1932, a Frenchman and an Englishman shared the honors, overcoming incredible odds to average 25 mph net and reach Monte Carlo without loss of marks. Heroes of this historic breakthrough were André Boillot (Peugeot) and Rupert Riley (Riley); the latter, rather confusingly, was a Riley company executive but unrelated to "the family." Following a spartan custom that was much in evidence in the rallies of the 20's and 30's, Rupert opted for a car with an open

(Continued on page 80)

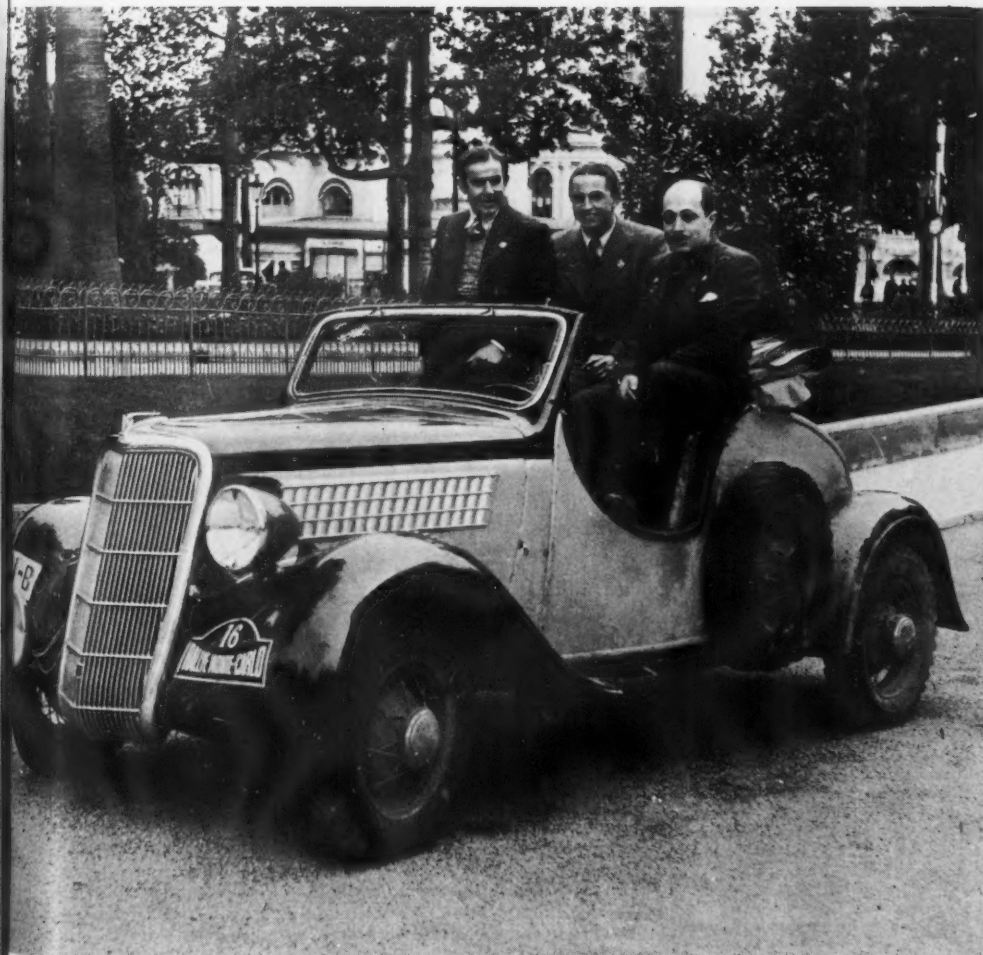


The photograph on the left shows one of the entries in the 1931 Monte. How does that line go . . . "It's such a comfort to take a bus . . ." At the other end of the size scale was the Triumph of Donald Healey (right) which was later shortened further by a freight train. The Ford below was entered in 1936 by Cristea and Zamfirescu and represented the high power/weight school of thought. It won.



# 20 MELANGE

by Dennis May



# Papier Mache Special

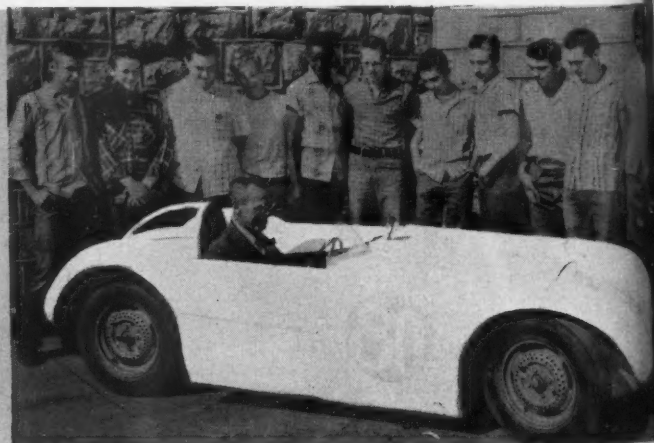
by George Lesko

► Never let it be said that a sports car enthusiast is at a loss when it comes to snap decisions. Doing the right thing at the right moment not only applies when lead-footing it down a straightaway, but when building a car too. This was the case with Walt Martin a few weeks before the Cumberland Nationals. Walt was anxiously awaiting a shipment of fiberglass to cover his newly completed Crosley Special when he received a letter informing him that the fiberglass would not arrive for at least two weeks. This meant Cumberland was out of the question, unless something else could be used to cover the skinless car. The novel idea of covering the car with paper was conceived, giving birth to the Papier Mache Special. But the story begins before this.

The notion to build a contender for Class H Modified laurels originated with a group of high school students and their sports-car-minded teacher, Walt Martin. Starting with plenty of enthusiasm and discarded bits and parts of various antiquated Crosleys, they constructed a car that was to come in second at the Giant's Despair Hill Climb. The frame was made from heavy one-inch pipe, giving the desired strength along with modest expense. To reduce weight, 1/4-inch holes were drilled throughout the supporting frame members. The basic frame was not perforated for fear of weakening the structure. The result was a frame weight of 35 pounds.

Based on a sound theory that independent suspension is unnecessary and does not give the desired road holding qualities on smooth American race courses, Walt Martin incorporated a solid axle arrangement. A unique suspension system was designed, allowing a wheel travel of four inches: two up and two down. By using quarter-elliptic springs 18-inches long and an adjustable retaining arm, the desired suspension characteristics were attained—flat-out cornering with an absolute minimum of lean. The disadvantage to such a system is that roughness in the road is telegraphed back to the steering wheel, as was evident at Akron, where the airport runway converted to a race course had gutters formed by continual plane landings. Once caught in these grooves, (front wheels in one rut and the back wheels in another) the paper special with its solid front axle developed a tendency to drift sideways, the irregular road surface being felt at the wheel and making steering difficult.

The brakes were stock Crosley, with the drums being drilled to reduce weight and aid cooling. A total of two pounds was taken off each drum as a result of the drilling. Practically no brake fade was noticed in the gruelling pace set at Cumberland. The perforated rims were of Austin heritage, taking 13 x 5.20 tires.



The Future Craftsmen of America admire the product of their combined efforts. Left to right are Floyd Musselman, Mike Hainsey, Tom Wilson, Ray Dively, Sam Woodlan, Paul Decker, Marvin and Wayne Dively, John Helsel, Dave Oberle and Calvin Pearson. Walter Martin, industrial arts teacher and project coordinator, and driver of the car, sits at wheel.



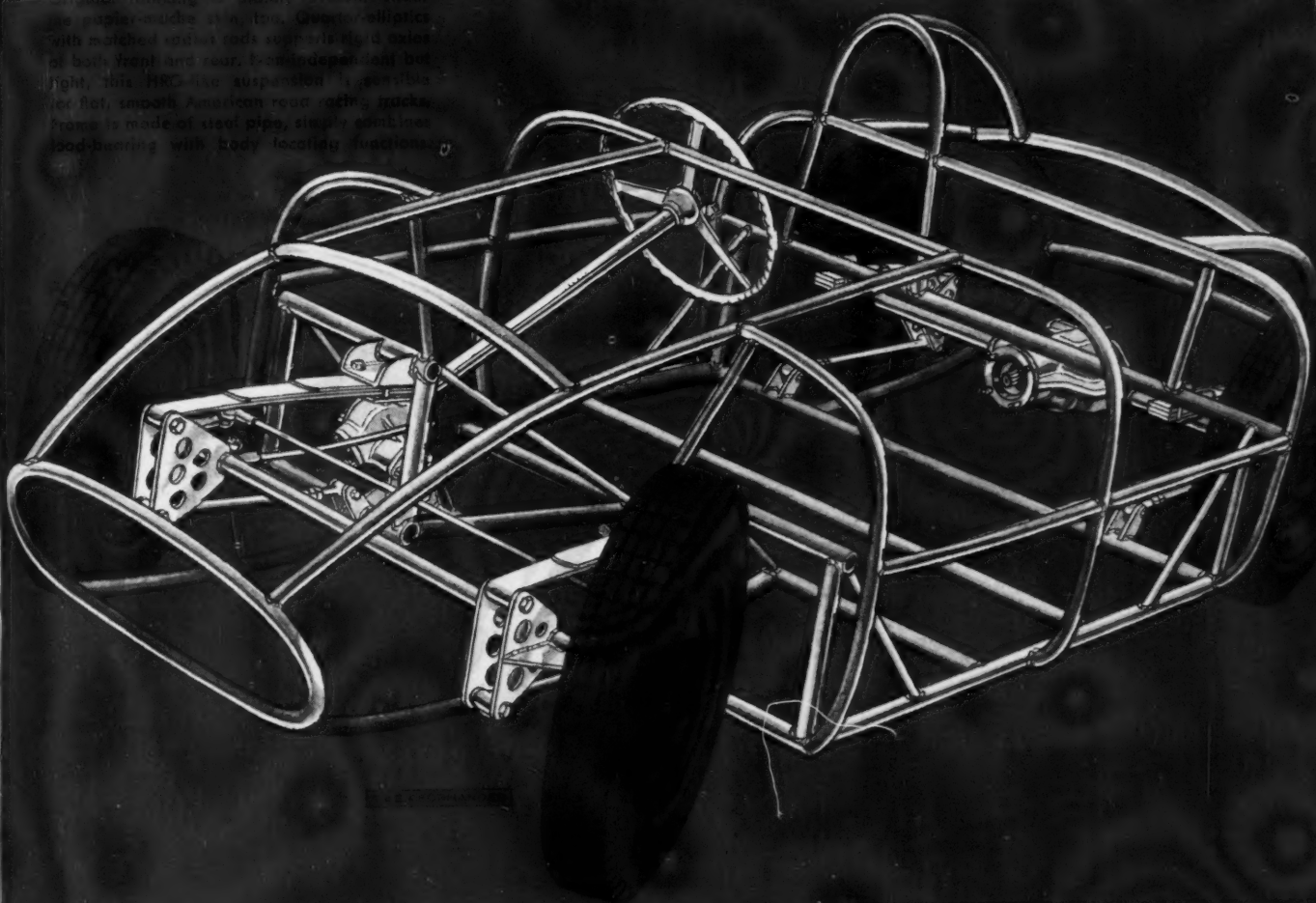
A stock engine was salvaged from a 1951 Crosley Super-sport for the power compartment. Ported, the engine retained the original 10 to 1 compression ratio. A stock 1947 Crosley cam was inserted and two Tillotson carburetors sat atop a fabricated manifold. Cylinders were bored thirty thousandths, giving a displacement of 740 cc. Lacking an indicator, rpm's were estimated at above 8500. Final drive and transmission ratios remained stock, as did the 12½-pound flywheel.

For an exhaust pipe to fit the irregular contours of the car, 12 pieces of 6-inch tubing were welded together. A

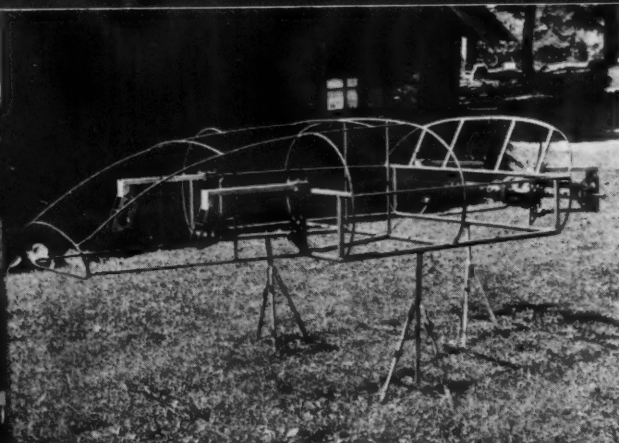
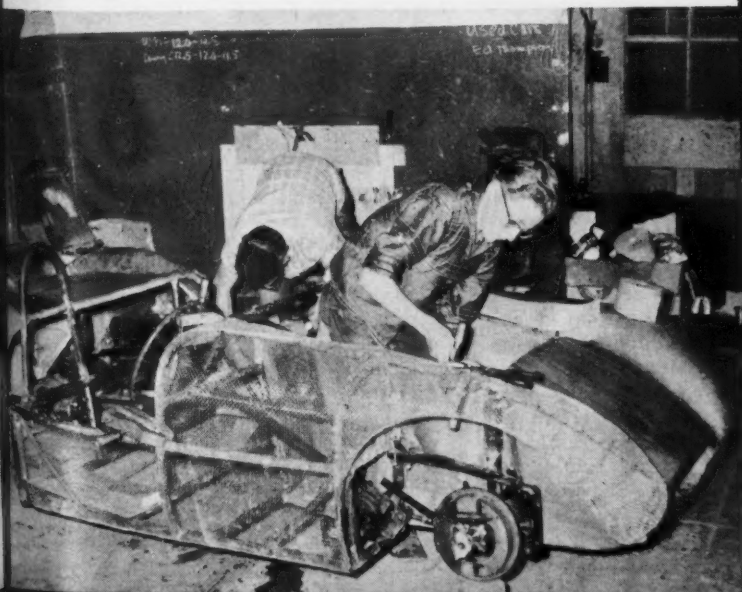
wheelbase of 78 inches was arrived at in an attempt to duplicate the near perfect proportions of the Mercedes-Benz.

Following the decision to fabricate a papier mache body, hardware cloth, sometimes called chicken wire or ⅜-inch screening, was attached by means of solder over the lightened body supports. The fine wire covering was easily shaped to the skeleton. With race day just around the corner, a heavy grade, waterproof-type paper towel was selected as the best quality of paper to use. Six rolls of paper towels

(Continued page 102)



Below: Body construction of the original car incorporated wire mesh shaped over the frame, then covered with lamination of paper toweling.



Above: Frame of FCA Mk II indicates better streamlining of new car.

### Revolutionary

#### Engine

#### From

#### NSU

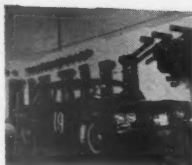


In brief, NSU has mastered the tempting but trying challenge presented by the so-called "rotor" engine, in which the standard engine cycles are carried out continuously in a circular direction without the use of pistons or other reciprocating parts. Attempts to do this with vaned rotors or near-circular rotating parts have failed, mainly because of the problem of sealing the joints between the rotor and the stationary surface.

At NSU, this has been conquered by the use of very sophisticated shapes for rotor and stator and an involved path for rotor movement, as well as a deceptively simple way of sealing the sliding joint between them. As viewed from its side the rotor resembles an equilateral triangle with its sides bowed slightly outward, and an eccentric in the output drive gives it the proper path in relation to the figure-eight-shaped stationary surface. The two mate at the apexes of the rotor where straight wipers, spring-backed like an oil-controlling piston ring, effect an adequate seal. The rotor's ends are pressed against the inner ends of the housing by the engine's internal pressures. Mixture is supplied by a carburetor, and a single conventional spark plug—admittedly a cold one—is used.

Thus far experiments in Germany have been carried out with a 250 cc (15 cubic inch) example of this design. It's not much more than a foot in diameter and weighs about 35 pounds—a figure which NSU engineers predict could be cut to below 20 pounds if light alloys were extensively used. At around 8000 rpm, a speed at which it turns with unnerving smoothness, it develops 43 horsepower. This, of course, approaches the unbelievable. It appears that structurally the engine can cope with speeds close to 20,000 rpm, and that development work is now being concentrated on broadening its effective rev range—especially at the bottom end.

Though it is reliably reported that one engine has been running in a Prinz, NSU feels that actual automotive use is about five years away. In the meantime they might approve applications that require less speed variation, as in boats or industrial usage. The rights to the engine's principles are licensed in this country to the Curtiss-Wright Corporation, which is doing a great deal of independent development work on their own versions of the engine. Several European firms are naturally interested in the design. Prominent among them is VW, whose Dr. Nordhoff has a substantial personal interest in NSU.



### A Lady

### Finds Three

### Lovers

from page 49

bility miserable, the Corvair unbelievably faster and more stable than seemed possible, its three passengers fascinated.

At the end of the eight miles we consulted and agreed. The Alfa owners would not have gotten their Veloces through the section a bit faster.

Roger took over for the mountains from Bristol to Asheville and, with the better paved roads, got even deeper into the turns and around them with complete control. Later, heading east for Chattanooga, I reconfirmed our discoveries while crossing the Appalachians for the second time. We practically got out of the car and said we were sorry for all the preconceptions we had held about her. She was dubbed Clarissa the Compulsive Corvair on the spot. We patted her rear louvers and blasted off looking for more wet, twisting roads. We found them and we drove her just as hard as we could and all we could find was praise.

What had happened? What had happened was that three under-steer-conscious sports car drivers—representative of most—had thought on dry roads that when the hop, skip and a jump routine started at the rear end in a corner, we were at the limit. In a sense, we were. We were in a low speed, oversteering condition. The point is, we were way below the Corvair's capabilities. At a faster rate (or in a faster corner), oversteer switches to understeer and you have several more tools at hand for raising performance. When the roads go wet, instead of hopping the Corvair's rear wheels delicately inch sideways. Driver ambition remains because he scarcely realizes he's adrift. It's difficult to be sure the rear end is out, but it is, and the front end has gone light as a feather. With this understeer posture, the rear wheels bite on throttle and the car steers itself around under acceleration in a completely predictable manner. Once such cornering characteristics are learned, of course, it completely changes the corner approach technique as outlined above. Finally, in our experience, the 16 hours of wet driving made far faster Corvair drivers of all of us on dry roads. It finally stopped raining somewhere in Tennessee.

Before you go out to twist a Corvair's tail, we should insert one precautionary note. So far as we know, the car prepared for us by Doane Chevrolet Co. of Dundee, Illinois, was completely stock—with one possible exception. We had to use Firestone tires—but no one said what kind of Firestones. Dick Doane was offered and accepted a set of "don't ask me what they are, just put them on" Firestones for his three team cars. We suspect that these were the new all-butyl designs out for one of their first market sampling tests. At this writing, it's impossible to find out for sure. But the tires were so good they were hard to believe. An indeterminate amount of our Corvair's wet weather performance must be due to the fantastic grip of the tires. And try as we would—and we really

tried—it was literally impossible to make the tires squeal on dry pavement on turns or during panic stops.

As to our modifications to the car, they may hold some interest both to prospective Corvair owners and to prospective endurance rallyists. We threw out the 15-26 factory tire pressure recommendations and settled for 20-35. It transformed the car. Some of the boulevard ride is lost. You can feel the expansion cracks on the toll roads but the ride is certainly up to all but the most matronly standards and the handling is distinctly improved. It is an essential step to obtain the kind of performance we did. We also used nitrogen instead of air in the tires to reduce the heat expansion effect on odometer readings.

Preparing for the rally, we assumed the full Monte Carlo treatment from picks, shovels and chains on down. Even with two spares in the front trunk, we carried an enormous amount of routine and emergency gear comfortably.

(Editor's Note: Because of the obviously heavy load carried on this car, its handling as discussed will not be typical of an unladen around-town Corvair. This experience does point up one of the major advantages of the rear-engined layout: When laden with luggage, up in the nose of the car, the vehicle tends much more toward real understeer—it becomes more stable, instead of tending toward instability as does a tail-heavy front-engined car. Renault owners, who have a similar large luggage compartment placed well forward, will have noticed similar handling phenomena.)

Fire extinguishers, thermos bottles, tissue, food, and spare bulbs and plugs were mounted, strapped and taped in various places to complete the motley picture. Almost the entire rear seat was left for stretch-out sleeping. We drove, slept and talked to the driver in three-hour shifts. We estimated that Clarissa scaled better than 3000 pounds when "all up."

Installed equipment included a tachometer that is worthy of a footnote. Eminently suitable for sports cars and new on the market, it features a legible dial reading to 8000 rpm in 200 rpm hash marks. The small sending unit mounted near the engine carries a four-way switch that gives a choice of inputs: magneto spark, battery spark, single or double point spark. It costs \$38 from Auto Meter Products in Elgin, Illinois.

Additional mounted equipment included a shortwave radio for receiving the 24-hour-a-day time signals from WWV and CHU and a double electrical odometer reading in hundredths of a mile.

Which brings us to the rally itself, left to last deliberately and we sincerely hope it's the last of its kind ever held. The five-day event pulled a disappointing total of 68 starters from eight starting points including one Canadian and one Mexican city and two each on the coasts and in the Middle West. It was conceived by the American Rally Club as the first truly continental rally for North America. It was an opportunity to give this country an F.I.A.—status rally that would draw international interest and support as well





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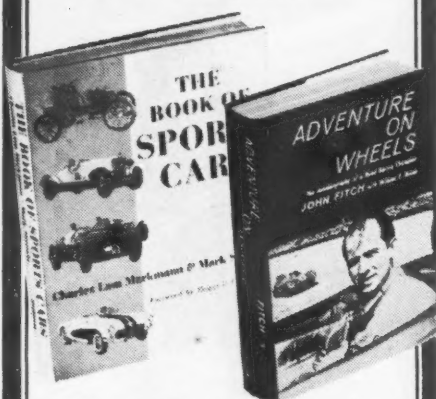
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## A Lady Finds Three Lovers

as giving American rallying an annual championship event of the highest order, greatest challenge, and broadest appeal.

In the sense of an international event along these lines, it would be thought that such a rally should challenge four things: the car, the driver, the ability to follow the route, and the ability to keep on time.

The first American International Rally missed the boat and in no small way. Apparently, the problem is one of basic concept of the appropriate nature of a rally. The conception of the 1959 AIR indicates that a rally is thought to be 99 per cent a challenge to the computation ability of the navigator. Every effort was made to make car stamina, driving ability, and the talent for following a difficult route of minor importance. Almost the only competitive challenge presented was to compute average speed changes, endlessly and insanely. Changes were called for at no change of route or road condition but simply for their own sake. There were more than 110 speed changes called for among less than 170 instructions. Average speed changes are a natural part of rallying and add a fascinating element—but this was madness.

Change of route instructions were monotonically simple. We were led by the hand with road numbers and names carefully spelled out and direction signs actually reproduced so that there could be no confusion.

The first three "driving days" of the event comprised a reliability run from the various starting points to a termination at Santa Fe, N. M. Each driving day of roughly 19 hours required a single average speed of between 35 and 47 mph. This was hardly a severe endurance schedule as nearly all cars reached the end of each day's run with several hours in hand. The final and only check point was pinpointed in the instructions and there was plenty of time to attend to car and occupants before checking in within 30 seconds either way of the exact minute. Purely as a car reliability run the three days had some virtue, largely negated by it being so easy to average higher speeds than those called for within the time limits. Many of us arrived at Santa Fe, for instance, with seven hours in hand before check-in time. Sickness, gross carelessness or mechanical breakdown were the only reasons that a few cars incurred penalty points on the reliability run. It amounted to a 2300-mile run to the start of the rally in Santa Fe.

In that city, an amazing 24-hour layover was provided after checking in before the start of the regularity run to Las Vegas. Of course, such a period eliminated any car or passenger endurance considerations from the event. Even more amazing, in mid-afternoon, several hours before the start of the first car, the entire route was handed out in map form with written route instructions covering every turn of the road to Las Vegas with one minor exception. All challenge to map-reading ability and route-following was elimi-

nated with this stroke. Those who knew the country also realized that on the roads specified there was little if any demand for good driving.

And so the 1959 American International Rally transpired. The fact that we were in automobiles engaging in an automotive sport seemed to have been completely disregarded. We were carefully conducted south around Albuquerque and herded due west for more than 350 miles on transcontinental route 66 with absolutely nothing to do but change average speeds and point the car for hour after hour after hour. For a Midwesterner or an Easterner, it would be difficult to conceive of anything farther removed from rallying as we understand the term. There followed nearly 60 miles of the same thing north to the Grand Canyon.

The remainder of the 900-mile run to Las Vegas showed little distinction with the multiple average speed change characteristic always dominant. The roads were often more interesting than the long opening haul west as we swung north through Zion National Park and finally south again. But, combined with the speeds called for at the time, they were rarely challenging in the sense we expect competition rallying to be. The scenery, which was magnificent, was nearly the sole subject of consuming interest.

The overall organization of the event, the clarity and thoroughness of the instructions, the attention to detail, the check point organization—in fact, nearly the entire execution of the AIR—was first-rate. What we question is the fundamental conception of the affair. This was rather pointedly reflected by the fact that it was probably the only international rally in history to be won by a Rambler station wagon. High performance competition rally machinery was far down the result list.

For Clarissa Corvair—or for any car—there were few road and speed combinations that were in any sense a test. When we could, we turned her on and were always pleased. Her true test had been in the Appalachians when we could choose our own roads and speeds—a sad commentary on America's first international endurance rally.

But sheer time in the car and increasing familiarity brought out many pleasing features in the Corvair—and, of course, several faults. We liked the electric windshield wipers and we liked the great front seat visibility. We had added a dog-leg gear shift lever extension over toward the driver which eliminated that horrible stretch for second gear. And we had shifted the seat back an inch by drilling new holes to give additional travel.

In Santa Fe, checking over the engine was a pleasure due to accessibility except for the middle spark plug on the left. They make a special tool for that one but dismantling the throttle linkage will work. All of us found the driving position excellent and we vary considerably in size. A little more seat padding would help bony drivers on long trips. There is plenty of scope for better springing. The suspension system rarely bottoms, but the seat bottoms continually!

A flip-down necker's knob did wonders for parking and other tight maneuvering.

(Continued on page 76)





**D. B.  
Sports  
Coupe**  
from page 43

Ratio spreads are reasonable, tapering off from 1.75 to 1.5 and then 1.3 as you progress through the gears. First gear enabled rubber to be chirped with ease; if cornering, an abrupt engagement of the clutch would achieve the same in second or third too. Shifts either way between third and second always required concentration, not to avoid crunching anything, because they are synchronized, but just to make sure you selected the correct gear.

The seats, upholstered in "nylon velvet" and rimmed with leatherette, were not to our taste in appearances but as so often happens, looks were deceiving. We have rarely experienced such comfortable seats for mixed touring and "pressing on." The cloth center panels aid the dished cross-section in preventing body side-slip, while the support for our backs was just right.

Instruments were commendably hooded to prevent glare, but the ridge in front of the passenger should be padded. Knobs attached to Bowden cables controlled the heater, defroster and choke, while a twist of the key (to the left) usually started the engine promptly. Lights are controlled by a lever on the right of the steering column. A U-shaped pattern ranged from off to parking to headlights and then back to tail lights only, the latter pertaining to some French customs we haven't heard of yet. Turn indicators had a timed control mounted on the frame "tunnel". A stalk from the left side of the wheel carried toggle switches for both windshield wipers (park automatically either left or right, whichever is nearest) and the non-existent fog-lights. Just forward of this stalk was a control for manual spark advance. This is a feature we thought we'd never see again, but alas, its sweeping 180 degree arc had no traceable effect on the engine at all. The hood release and the dash light rheostat were along the lower edge of the dash. The "horn" button was sheer decoration; instead you press in on the end of the headlight knob. Gently, one horn; firmly, two. The French are really fascinating and so are their cars, which have personalities just like people.

The steering wheel has a rather large rim thickness; this enables it to be grasped firmly with comfort. A ribbed surface and "finger notches" to improve the grip are further indications that this is a driver's car, not a stylist's.

Front wheel drive, being rare on these shores since the demise of the Cord, has always had a fascination to enthusiasts. Long before it was understood that a "power oversteering" car did the same thing, the idea of using the driving wheels to hold yourself to the inside of the turn had a magical appeal. "Front wheel drive cars can corner better." Well, it's a nice theory but we see nothing magical about it. Quite the contrary, what bothers us is what to do when you're cornering on the limit and want to slow down? The answer, of course, is to use your brakes before you

(Continued on page 80)

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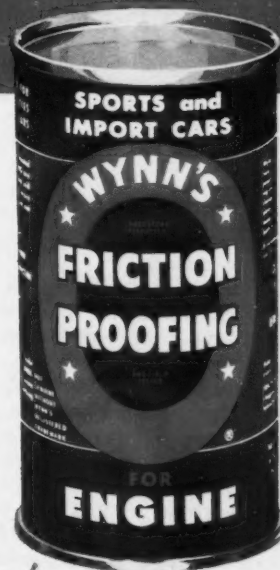
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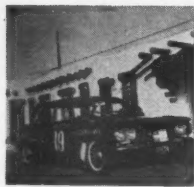
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## A Lady Finds Three Lovers

Popping out one of the rubber plugs in the bottom of the front trunk eliminates the accumulation of water that apparently leaks in around the headlights.

The brakes faded badly after two panic stops at the beginning of the run. By the end they had bedded down and five consecutive panic stops faded them hardly at all. They pulled up evenly and powerfully and were up to all our demands.

In one respect, at least, we found Clarissa tough. I managed to take her over an eight-inch town curb at 20 mph heading into a gasoline station in the middle of the night. There was an awesome suspension reaction but no bottoming and not a mark on the rim. Nothing ever rattled, shook loose or broke in the 3500 miles we drove her before returning her for company use on the West Coast. The other two crews in our three-car Doane Chevrolet team had similar Corvair reactions and similar stories to tell at the end.

How did car #19 do on the rally? Lousy. Those same wonderful tires meant gross tire expansion due to centrifugal action that could not be accurately enough applied to correct the odometer readings. Check point timing at eleven locations on the regularity run was to the second and we were repeatedly many seconds off in our computed performance, piling up the penalty points. Those "tires full of wires" from France are the only answer to this rally problem.

At the moment of writing, those of us aboard Corvairs on the AIR probably have more varied Corvair experience than any but a few GM test drivers. What would we like changed in a Corvair if we owned one? I think we would all agree on the need for stiffer shock absorbers. It oscillates far more than we would like. Adjustable Gabriels for the economy-minded or adjustable Konis for the fastidious would help a lot although the suburban family might not agree.

Our crew didn't mind the steering ratio after all. If they can drop it down to 3½ turns, as they say they might, fine. But we don't think it's essential even for the enthusiast and might actually make cornering more difficult.

Of course, we would like some more steam and we would like another gear. The Corvair on hills, either eastern or western, is scratching and clawing (in a ladylike manner) to maintain 45 mph up a slope any sports car would murder. She is all wrung out in second gear at that speed and can't find anywhere to go in third. On the straights, over seventy in third requires a gracious and patient driver attitude. You will finally see 90 but it is a long way back down the road to where you hit 70.

As to what 3500 miles revealed to us about Corvair economy, the story is not so good. Something happened between the prototype testing, when they really

got 25 to 30 mpg, and the production versions. In the hard Appalachian driving, we were down as low as 16.1 mpg and never over 20. Out west on the plains, we got as high as 21.9 mpg. For one thing, the excellent gasoline heater has a more-than-expected rate of consumption. In addition, Clarissa insisted on a diet of premium gasoline, running on and ping-pong if forced to eat regular. Our experience was not unusual.

Happily, all three problems—power, gearbox, and economy—are getting attention. The economy angle will be straightened out by the time you read this as a result of intensive analysis of the carburetion now underway in Detroit. And next spring we believe American roads will be graced by a GT Corvair calling on 40 per cent more horsepower through a four-speed box.

But the important thing to us is Clarissa Corvair and her sisters today. These are four-door sedans produced in Detroit that can be taken off the showroom floor and driven for fun. We drove them farthest and hardest for the first time in public hands. The sports car drivers on the American International Rally found these stock Detroit sedans a delight and a challenge to the heartiest devotee of the open road. That's news.

—dvd



## 1959 Road Racing Roundup from page 31

extraordinary. Stirling's rear tires were worn but still had a safe amount of tread while Jack's were particularly bad at all four wheels.

Another driver causing considerable comment in Europe this past summer has been Dan Gurney, who by virtue of his speed, his obvious natural talent, and a very strong desire to be out in front made everyone sit up and take notice. He made the best of a bad car at Portugal, finishing third in the Formula I Ferrari, despite suffering terribly from the heat. Dan was fast at Avus—at Rheims—at Monza, while on the latter circuit he was beaten by Phil Hill. Gurney is a desirable piece of talent for 1960. If Ferrari lose him to the opposition, the loss will be a hard one. 1959 will go down in history as Dan's first really successful year at Formula racing. He is another of the younger generation, such as McLaren and Bristow, boys who will be the masters of tomorrow.

Phil Hill's season has been a mixed one; certainly not as good as he would have liked. Contributing to it were a definite lack of confidence in the car, and a noticeable lack of the "inspired" spirit that Phil has had in the past. His second place at Monza was a wonderful job and if the team manager had attempted to use either him or Gurney to wear down Moss, the outcome of the race might have been different. As this is written, the word has just come through of Phil Hill's successful drive with the MG record car at Bonneville, 255 mph, a new class record, and another honor for Phil.

Off again and then on again, is the only way to describe the season of Tony Brooks.

He won Rheims and Avus but at Zandvoort, Portugal and at Aintree, when he drove a Vanwall, either the car or he was not in a proper state of tune and good results were just not forthcoming.

Cliff Allison, "third string" Ferrari driver in 1959 went like a bomb when he was given a proper car. At Berlin, Cliff astounded everyone by being fastest in training, fortunate enough as he was to receive one of the best cars. Cliff is a regular, steady, and fast driver. His personality is uncomplicated and he loves to drive, but like all the Ferrari team drivers this year, he was discouraged by the organizational chaos and bad preparation. Cliff is, we suspect, a "sleeper", from whom we may all hear more next year. He had a good drive at Monza, finishing fifth behind Gurney.

The Aston Martin Grand Prix effort never really got off the ground in 1959, simply because the cars suffered from a poor power-to-weight ratio. Salvadori and Shelby did their best but it just wasn't enough. We hope that David Brown will not be discouraged by the poor showing of his cars in 1959 for the thin field of Grand Prix competitors needs his support.

Gazing into the future, we hear plans of the return of the Vanwall in 1960. Colotti has reportedly been retained by Tony Vandervell to do the designing of the new car. Tony has been seen at practically every meeting this year as has his manager, David Yorke, reportedly scouting for talent. The one performance of the older Vanwall at Aintree was extremely disappointing; this was the car that Moss toyed with the idea of driving at Rheims, but it was plagued with brake as well as handling difficulties.

Where will the top drivers go in 1960? It is still too early to tell but it is expected that several major team changes will take place. With Lance Reventlow on the verge of sending his Formula I Scarab to Europe, he may attempt to sign up either Gurney or Hill. Brabham recently drove the Formula II Porsche and was delighted with it, and in particular with the brakes, which he felt were superior to those on the Cooper. However, it's doubtful that Porsche will be able to lure Jack away from Surbiton.

The history books will note the death of Jean Behra in 1959, killed in an accident that many felt could have been avoided on the banking at Berlin. But Behra himself would not think of it in these terms if he were alive today. The Avus sports car "curtain raiser" was another motor race, a challenge, and he was in a spot to show up the two works Porsche drivers, Bonnier and Trips. An outstanding tribute to Jean Behra was written by Denis Jenkinson in the September 1959 issue of "Motor Sport"; we quote it in part: "Jean Behra probably had more 'guts' than the majority of today's drivers put together. He never knew the meaning of fear and in consequence he tended to drive over the limit more often than not, and throughout his ten years of motor racing had an enormous number of accidents. Any good driver's death is a loss to motor racing but in losing Jean Behra we have lost a rare personality of the present age of racing for he really had a passion for racing cars that



was a joy to have known."

Outstanding at Portugal and then at Monza was Stirling Moss: his 1000 Kilometer Nürburgring sports car drive was without a doubt the finest of the year, perhaps of his career. Stirling improves with age; his versatility, his uncanny ability to size up a situation and drive to it was never better exemplified than at Monza this year on the occasion of the Italian Grand Prix. He led the Ferraris to defeat—simply by holding back until all three of them went into the pits one after the other for fresh tires while Stirling motored on, saving his tires and engine to enable him to finish first. As soon as Stirling joined Rob Walker's team for a permanent stay in mid-season his luck changed and it is not out of the question to consider Stirling as 1959 World Champion; he must win Sebring however, and do fastest lap as well.

Looking briefly at the 1959 sports car picture, the three major contenders for the title—Ferrari, Aston Martin and Porsche—were closely matched the entire season, although Porsche threw away the opportunity of winning the '59 Manufacturer's Championship by not fitting knock-off wheels to their RSK sports car at Goodwood. Aston Martin deserve their victory entirely. The fitting of built-in air jacks to the DBR1 at Goodwood was a real step in progress; one wonders why the idea has not been copied from Indianapolis before this. Ferrari could have had the Championship in their pocket, if team organization had been what it should have been. There's no place for misunderstood signals nor bad preparation in today's racing. Cooperation between driver and engineer, mutual respect, and a desire for the team to win rather than an individual driver are the elements that have been wanting all year.

Aston Martin's victory in the '59 sports car season was brought about by first class organization and top notch pit work by a team of excellent mechanics. It is doubtful if Aston Martin will continue to race sports in 1960. Not only would they like to spend time on Formula racing, but David Brown has just announced a competition version of the DB-4 GT coupe, powered by a 224 cubic inch 331 bhp engine. Gran Turismo racing is on the ascendency in Europe, and the Gendebien-Bianchi victory in the 1959 Tour de France was the third consecutive victory for the versatile Belgian. In a typically European muddle, the disc brakes with which his Berlinetta Ferrari was factory-equipped were removed at the last minute fearing a breach of the regulations. Actually, the Tour regs state that such mods are legal in the GT Special class. But Gendebien had an easy time in the Tour this year. Lack of strong competition allowed him to stay just comfortably ahead of the second place man, Mairesse. We'd like nothing more than to see greater competition in European GT racing, from Chevrolet for instance with their Corvette. The new Aston DB-4 will certainly challenge the Ferrari 250 Europa's long reign.

Cooper-Climax, Aston Martin, Stirling Moss, Jack Brabham—these are the names of 1959, and for 1960?

—ja

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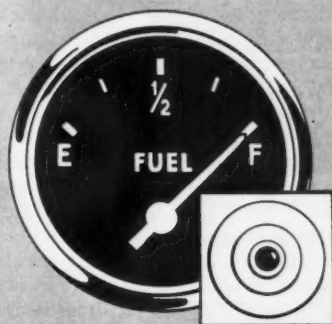
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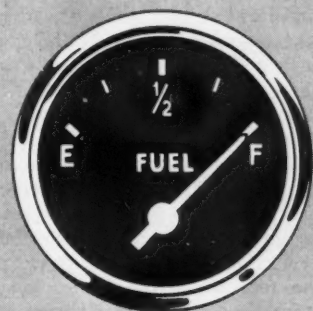


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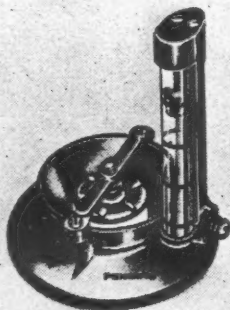
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from page 55

front brake loading being linings 1/4-inch wider than the 2 1/2-inch ones used at the back. Otherwise the 1959 Buick mechanism (on '54 backing plates) and "soft" brake linings—for smooth pull-free operation—are straightforward all around.

Carnes' goal of smooth, straight braking is reached in full. Without excessive effort on the pendant pedal the Bocar decelerates impressively and keeps on doing it—or did, anyway, during the length of our trial. To be consistent a Buick master cylinder is also used, sharing (on production versions) a single fluid reservoir with the master cylinder for the hydraulically operated clutch. Alloy-rimmed Borrani wire wheels and knock-off hubs are fitted.

## POWER APLENTY

SCI has always held that supercharging was the ideal route to adequate power for double-purpose sports cars, providing maximum output without destroying low-end performance (SCI, July, 1958: The Blower Route). Not feeling harnessed by class dividing lines, Bob Carnes selected this approach and did it, characteristically, in the dramatic and all-out way. Several sports cars showed up at Bonneville this year with massive GMC blowers mounted dragster-fashion ahead of the engine—a technique with classic backing in the shape of the blower Bentleys and MG K3 Magnettes. But Carnes has inserted one of these highly romantic assemblies in the XP-6, giving it an almost overpowering mechanical sex appeal. If the sight of all that gleaming plumbing under the hood doesn't do it, then massage the accelerator pedal and glory in the whirr of drive gearing and the Maseratish exhaust crackle that only a blower can provoke. If superchargers haven't caught on as a sales feature, it's only because they haven't been properly promoted. This one produces a compelling urge to drive and to buy.

In this case, as throughout the Bocar, the installation has been made in an economical way that will facilitate later service of the engine. Extreme custom components have been eschewed wherever standard ones would work. The charger proper is a GMC 4-71 Roots unit, modified along the customary lines by Chuck Potvin to allow safe operation up to 9000 rpm. Potvin's chain-type coupling was also fitted to provide a direct drive from the crank noise; peak boost was designed to be 14 psi at 4400 rpm. Carnes' crew made up the piping for the installation on the prototype, but to simplify matters Potvin may be fabricating the whole assembly for future XP-6's. No better choice of talent could be made.

The fine balance, selective assembly and general special care bestowed on the fuel-injected Corvette engines have made them ideal for Bocar use, and no less so for the blown version. Carnes simply inserts the blower and its piping between the metering air intake horn and the plenum chamber "doghouse" atop the engine. The

metering cone is spaced out 3/8 inch to increase (nearly double) the unit's air capacity. Being placed low down at the left front of the engine, the metering unit is close by the drilled throttle pedal and is linked to it by a single rod. This direct link, plus the fine job of recalibration that Bob and Lee Marshall have done on the nozzles, gives a smooth, consistent throttle response that could not be bettered. It's racing quality.

## PISTON CHANGE NEEDED

Bob Carnes wanted to retain the Corvette pistons for service reasons, but the combination of heat and rpm loadings was too much for their ring lands. Fortunately he happened upon a sturdier forged piston that did the job while weighing about half an ounce less than the standard part! Shaped to supply a 9 1/2 to 1 compression ratio in this engine, the pistons are made by Thompson Products and are termed "Powerforged". Bob equips them with Grant rings and installs them with .007 inch skirt-to-wall clearance. No other significant engine changes have been made. Carnes plans to try heavier main bearing caps and to advance the cam timing five degrees experimentally, as part of the XP-6 development program.

As can be seen on our cover, the water pump and generator have been neatly handled by Bocar at the front of the supercharger. The whole blower assembly weighs 111 pounds complete with the intake horn, but since it includes some accessories it actually adds only 71 pounds to the total weight of the engine. In very early trim, as I drove it, it added about that many horsepower too, the performance being equateable to about 380 bhp at 6000 rpm. With development it should be possible to move over the 400 figure; the hoped-for output from this combination is 440 bhp.

Clutch and gearbox are standard Corvette units, the latter being changed only to the extent of a modified shift mechanism mount to move the lever forward and provide a "tighter" shift pattern. The extreme rearward mounting of the engine results in a ridiculously short drive shaft very little longer than the 14 inches the XP-6's wheelbase has been stretched.

## WEIGHT, COST AND PERFORMANCE

Without its engine the XP-6 weighs approximately 1400 pounds, and with blown Chevy power it scales 2225 pounds with oil, water and five gallons of gas. Though he hasn't yet set it definitely, Bob Carnes feels that the price will be from \$1000 to \$1500 above that of the \$8700 XP-5, to include the added work on the engine and front suspension. Carnes has set a ceiling of \$10,000 on Bocar prices, feeling that he'll defeat his own purpose if his cars exceed this figure, but does attempt to set figures which will be realistic in view of the great volume of expert hand work that goes into every Bocar. Finish is a fetish with Carnes. His personal XP-6 was built mainly for racing use but is superbly trimmed in a manner that no touring sports car would be ashamed of.

As was intended by the designer, we drove the XP-6 down to the Continental Divide Raceway from Denver and tried



it out on the track with no changes except slight adjustments of tire pressure. Around town the lack of a fan naturally hinders operations. You just shut the engine off at traffic lights, a practice familiar to owners of many less potent automobiles. This Bocar's idle and general low-end tractability is if anything better than the Corvette from which the engine came. Once you're used to the controls it's a cinch to drive anywhere.

The surprise comes when the road is clear or a fine track like Continental is spread out ahead. This Bocar hurls itself forward with an effortless violence at any speed and in any gear. It just doesn't care. When you step down hard it is On Its Way. The statistics of its acceleration are marred by the unavoidable amount of wheelspin that occurs from a standing start, but once traction is gained it is maintained well up the speed range. This lack of starting traction renders its e.t. in the quarter mile a bit long, but the XP-6 registers very fast speeds over the finish—from 110 to 115 mph. The figures shown here were, by the way, obtained in the mile-high Denver area where engine output is tangibly inferior to that at sea level. Taking this into account the XP-6 seems to perform very much in the class of the Scarab sports cars it hopes to equal in competition.

Combined with the superb throttle response, this immense excess of power makes the new Bocar a seeming cinch to handle. This writer has never so fully experienced the thrill of driving a car almost entirely by the throttle. A nudge of the wheel or a touch on the brakes is needed to set up a situation, after which the throttle is used to determine the cornering angle and speed. In a car like the XP-6 it is literally as easy as writing it, and seems by far the most natural thing to do. What's more, it seems to get through those corners neatly and fast.

#### MORE BOCAR VARIANTS

The XP-5 and XP-6 are definitely on the production list at the Bocar factory at 1240 Harlan Street in Denver. Bob is projecting an XP-7 which would combine the XP-5's 90-inch wheelbase with the new solid-axle front end, and would be powered by a Chevy boosted by a 4-71 charger atop the engine, belt-driven along conventional lines. Likely to be lighter in weight than the XP-6, this could be the most potent combination yet.

Bocar Mfg. Co. is a significant project to SCI because it is actually producing cars in a businesslike manner. We feel it's a healthy sign if specialized manufacture of this type can make headway in this country, and were impressed by the physical facilities of Carnes' plant. When I arrived, though, I was at first startled by Bob's insistence that I drive the XP-6 at the first possible opportunity. After all, here was a very powerful car which one does not unleash on the spur of the moment. Then I drove it. Now I know why Bob Carnes has such candid confidence in his product. This new Bocar is one terrific automobile.

—kel

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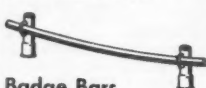
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D. B.

Sports Coupe

from page 43

get to the corner. By the time the question comes up, it's usually too late.

The D.B. does have excellent brakes. Based on the Panhard's, they have many pounds less car to stop, even though it goes much faster. Equally important from the safety angle and best of all from the enjoyment point of view is the delightfully precise steering. Light, quick, sensitive, all the desirable adjectives seem to suit it to a tee and the D.B. is great fun on sporty roads.

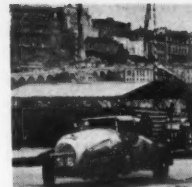
With the comfortable seats helping, the suspension treats rough going with choppy disdain, surprisingly little fight coming back through the rack and pinion steering. The car is stable on the straight, but because of its light weight and large size, gusty side winds would probably need some corrective actions. This is only a guess, as our test was run in calm weather throughout.

When really trying hard, which is our favorite part of the test procedure, we found the D.B. would seem to lift the inside front wheel under power on sharp turns (40 mph). Not visibly, but enough that the tire concerned would start to spin. This cut the torque going to the other driving wheel, the car would lose its thrust, washing out slightly from its path around the turn and dropping the inside front wheel down where it could get a firm grip on things. A shade more roll stiffness at the rear would seem in order, as the Panhards and D.B.s seen racing seem invariably to raise the hind wheels, usually a good six inches in the air.

One of the nice features of racing a coupe is that you can travel to the races with all your gear right in the car. Whenever you want to leave the car, whether at a motel or restaurant or such, it is no trouble at all to just lock the doors and walk away from it. Small things in the back seat are also more accessible when under-way if they don't have to be hidden from both the wind and prying eyes. The D.B.'s trunk should be cavernous, since the vee-shaped rear axle has nothing to do except bounce up and down, but by placing a shelf too high over the horizontal spare tire, valuable space is wasted. Making up for this, there is lots of room behind the seats.

The D.B. coupe costs about \$3200. With the desirable (and allowable) racing options it is \$3500 to \$4000. To compare it on performance per dollar to others in its price class, the normal Giulietta, the Austin-Healey 3000 or the MGA Twin Cam, is to judge it unkindly. Of the nine classes for Production Sports Car racing, actively contested, eight are dominated by a single make of sports car. The D.B. is one of this select group. If you're looking for that long-forgotten dream car, the genuine dual-purpose sports car that is capable of winning its class without putting you in hock forever, then you should look into the D.B. Sports Coupe.

—sfw



Monte

Carlo

Melange

from page 69

tourer body, in spite of temperatures involving risk of frostbite. Skidding, sliding, bucking, stalling, it took him and his co-driver twelve hours to travel the fifty miles from Verria to Salonika, Greece. Meanwhile, more than a thousand miles to the north-east, another member of Riley's rally task force, Jack Hobbs, was driving single-handed for 48 hours straight, clear from Stavanger to Hamburg. This one-man enduro, punctuated by two bad crashes, constituted an unofficial record of rather short duration; later the same day a woman competitor checked in at Monte Carlo after driving sixty-two hours without relief. It didn't relieve her, either, to be told she'd arrived just seven minutes too late to rate a place on the finishers' roll; dead on her tail from lack of sleep, she slumped into unconsciousness at the wheel where she'd stopped the car, plumb between the streetcar tracks on Monte Carlo's busiest thoroughfare.

Following Healey's outright win in 1931, British cars and crews didn't collect the main prize for more than twenty years, but Mrs. Vaughan's Coupe des Dames victory in '32 made up for that. The story of *l'affaire* Vaughan reads like an episode from macabre fiction, rather than factual happenings.

Mrs. Morna Vaughan, a middle-aged London surgeon and new to rallying, started from Umea, Sweden, not far south of the Arctic Circle, codriving a 750 cc Triumph with a girl medical student, Charlotte Naish. For more than 2000 miles, through Sweden, Denmark, northern Germany, Belgium, across France to within a hundred miles of the finish, these memsahibs coped with conditions and obstacles that were tough even by the standards of a bitter Continental January. They didn't know it but they were all set to cop the coveted Coupe des Dames, the more experienced competition having taken a terrible beating on this and other routes. Something else they didn't know was that a few kilometers ahead of them, near Salon in the Bouches du Rhone, a Danish rallyman, Dr. J. J. Sprenger van Eijk, had stopped at the roadside with his Graham-Paige down on its back rims.

Two of van Eijk's crewmen were working on their tire problem, in rear of the Paige and momentarily obscuring its tail lamps, when a big Rolls, also on rally plates, came up fast from behind. The Rolls driver braked, on sheet ice awash with rain, but without effect. What stopped the Rolls when it did stop was a buffer of human flesh and bones. The two Danes were pincered agonisingly between the RR's front bumper and the Paige's stern.

Reaching the scene minutes later, the Vaughan-Naish team found themselves with duplicate casualties on their hands: double compound leg fractures both.

(Continued on page 82)



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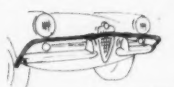


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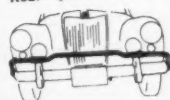
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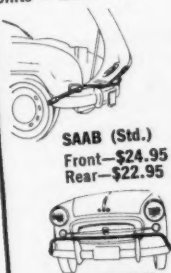
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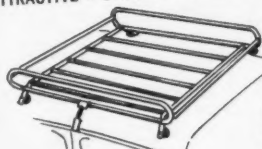
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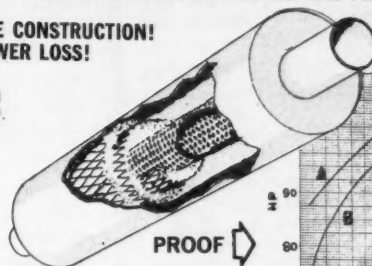
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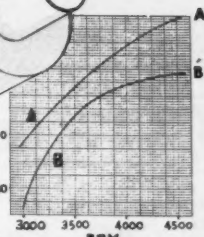
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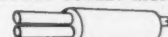
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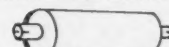


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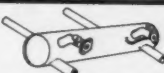
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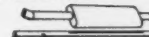
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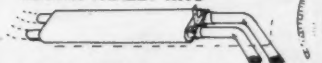
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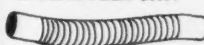
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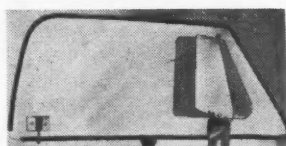
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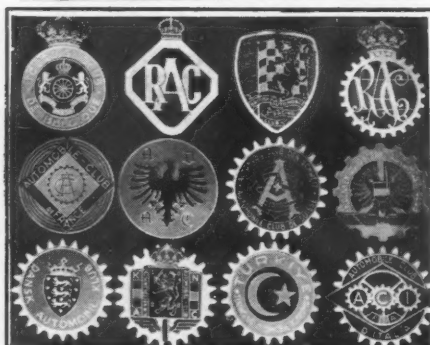
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## Monte Carlo Melange

from page 81

Four or five frontiers back, Mrs. Vaughan now recalled, an overzealous customs official had confiscated the morphine out of her first-aid kit. So, she had to work without anaesthetics. In a continuous downpour of rain, with her patients stretched out in a shallow ditch, she set their smashed bones, refusing to quit until she'd supervised their despatch to hospital in an ambulance that showed up just as the last operation was completed.

One of the Danes — he'd suffered other injuries as well — died within hours. Vaughan, though in the last stages of exhaustion, drove through the night at hair-raising speed over the last lap to Monte. She was late but not as late as the next-up Coupe candidate, so the pot was hers. This was the first women's win by a British car and crew in five years, and wouldn't be repeated for almost a quarter of a century.

Between the wars a high percentage of Monte drivers and crews, particularly British ones, were pure greenhorns, under-equipped both temperamentally and physically for this midwinter hell on wheels. Proverbially, "he scoffs at scars who never felt a wound", so the inexperienced element just naturally tended to gravitate to the remotest and most benighted starting points. But sometimes the shock treatment of the first few hundred miles was enough for them. Until or unless it became monotonous, the sight of capsized rally cars in roadside ditches and ravines, maybe a dozen in an hour's drive, could be pretty unnerving. On the killing Umea route in 1932 it unnerved one novice crewman so badly he was only restrained from skipping at the first checkpoint by his skipper's reminder that he, the skipper, was the custodian of the party's passports, and if the would-be quitter wanted his passport he could try taking it by force.

In the geographical nature of things, American contestants were understandably a rarity in the rally, although Joel Thorne, well known as the father of expensive Indianapolis projects, was an Athens starter in 1935. Having traveled about 4000 miles to get in the act, and also having shipped his V8 Ford from home, Thorne and associates plowed rather less than one hundred miles along the Athens-Monte axis before being forced to call it a day. They didn't have to hang their heads, though, because nobody from Athens got any further than that.

American cars, on the other hand, with their high road clearance, beefy build and lightly stressed engines, were always a potent factor in the interwar rallies, right from the time when van Eijk won outright in '29 with his Graham-Paige. But maybe it would be truer to say his Graham-Paiges; after a crash that practically decimated the car he'd started out in, the

rangy Dane paid a call on a conveniently located G-P dealer and cannibalized a car out of the showroom for wholesale replacements. He owed himself a new rig anyway, the original having already done 170,000 miles before taking off from Stockholm. This 1929 rally was possibly all-time's severest, and only 24 out of 93 runners made it to Monte Carlo on schedule.

At a time when the rally was usually won and lost in a sort of circus test at the finish — the dramatic yet ridiculous *epreuve de maniabilite*, lasting little over a minute unless you hung about — entrants were stuck with an annually recurring problem: on the one hand, chances of survival on the road were obviously in direct proportion to the robustness of one's equipment and the weather protection it afforded; on the other hand, and in conflict with requirement one, success in the brief but vital autobatics at journey's end depended mostly on ultra-high power/weight ratios. On balance, the truly dedicated rallyist tended to settle for a practically unfurnished machine powered by a big hopped-up engine, leaving it to the crew, in the absence of a hard top and anything as effete as side windows, to derive the necessary warmth from the fire in their own bellies.

Epitomising this genre were the feather-weight V8 Fords operated by the advanced Rumanian school headed by Col. Berlescu and the 1936 winners, P. G. (Wizard in a Blizzard) Cristea and Zamfirescu. Slightly less stark but just as ingenious mechanically was the V8 of roly-poly Bud Bakker Schut, from Holland. Bud's favorite aid to *maniabilite*, which several other Ford drivers copied, was a steel hawser connecting the steering drop arm with the back brake levers; turn the tiller one way and it merely steered, turn it the other way and it simultaneously locked the back wheels, enabling the car to spin right around in its own length at speed and leaving Schut's right hand free to engage reverse before he'd stopped traveling forward. Thus the techniques fostered by the famous — or infamous — wigglegoggle test. Bakker Schut won in 1938, though by this time he'd "gone straight", anyway in one sense, and switched to a fairly normal sedan lacking outlandish steering-to-brake hookups.

Both the Berlescu and Cristea Fords carried gossamer-light roadster bodies, the latter's consisting of doped balloon fabric stretched over a cobweb of alloy tubes; there was also some cardboard in its construction. In snow on the road sections, Berlescu experimented with an elementary form of caterpillar traction, consisting of two spare wheels mounted just ahead of the driving wheels and acting as locators for wide tracks; at anything above about 20 mph the tracks broke up under centrifugal force, so the idea was dropped.

The design for the wigglegoggle test being published, complete with dimensions, months in advance of the rally, serious contenders went into training for it in a big way. Cristea, in 1936, performed his practice woggles back home in Bucharest no less than 200 times. This, it seems, may have been a few times too many, for when he came to do the caper



in public, with the International Sporting Club's clocks on him, he forgot an essential part of the manoeuvre and just left it out. Fortunately for him, each driver was allowed two turns, and the second time he forgot nothing.

In *formula libre* days of yore, the rallymen of a dozen nations vied in putting wild, wilder, wildest interpretations on that word *libre*. In 1930, the year that Tallin, in Estonia, was first scheduled as a starting point, Rudolf Caracciola had his Mercedes fitted with enormous truck wheels (duplicated at the back incidentally), giving the car a ground clearance like a giraffe; while rivals on the same route battled with frozen ruts a foot deep that buckled their wheels and twisted their axles when they tried getting out of one pair of grooves into another, Rudi just ignored the dimly defined roads and took to — sometimes ranging far beyond — the virgin shoulders. He got along practically unhindered, and three times as fast as the rest. Prior to 1930, no wheeled traffic had attempted the Tallin-Riga stretch in 180 years, and now the Tallin contingent saw why.

In 1932, a French crew from Umea dispensed with *pneus* altogether, using pnails instead, with their heads welded to the wheel rims and the sharp ends projecting radially to bite deep into ice and frozen snow. This was the year that Donald Healey, keen to repeat his win of the previous January, underwent a voluntary ordeal by undergearing — 2300 miles of it — by fitting his 4½-liter Invicta with such small wheels the chassis side rails

grounded if the tires were deflated. Flexibility was known to be the decisive factor in the final test, so Donald was buying himself great gobs of flexibility at a cost of a maximum speed reduced to under 40 mph. Unfortunately for Healey, Vassel, the Hotchkiss star, approached the same problem a more effective way; wiser so what he could get away with, he ran on a normal axle ratio all the way from Umea to Paris, then visited the Hotchkiss factory there and had the gearing lowered a big piece before proceeding to Monte. That fixed it. Vassel won, beating the Invicta man by a sliver in the eliminator.

A dodge in the Vassel spirit but a different application was instrumental in winning the small car class for Triumph driver Jack Ridley in 1935. On the long road haul, where reliability came first and performance second, he ran with the rotors at rest in his bolt-on blower. On arrival at Monte he slipped the belt on the supercharger pulley and, like Jack Horner pulling plums out of a pie, extracted 25 percent more power from his 1200 cc. When Healey ran a Triumph in the rally, on the other hand, he had the blowers blowing nonstop; this was the controversial Dolomite model, a twin-cam straight eight with dual superchargers that appeared to be a carbon copy of the contemporary Alfa Romeo (The Italian firm subscribed to this theory too). Donald, as related in an earlier SCI story (*The Sixty Fast Years*, August 1957 issue) came very near to death

(Continued on page 84)

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## Monte Carlo Melange

from page 83

in the Dolomite when a freight train cut  
it in half at the firewall on a Norwegian  
crossing. The Triumph was a total write-  
off but the sole damage to the crew was  
the loss of one tooth by Donald's navi-  
gator.

The human mortality rate was always  
surprisingly light, considering the largely  
amateur cast of the drama and the im-  
maturity (as it seems in retrospect) of  
car design in the 20's and 30's. H. B.  
Christensen, a well-known Danish rally-  
man, met his death on the Umea run in  
1932 when executing an impromptu  
*epreuve de maniabilité* to dodge a day-  
dreaming sledge driver. One of Sprenger  
van Eijk's crewmen, as recalled earlier,  
died in the same year's event. Gordon  
Holmes, hazed from lack of sleep, momen-  
tarily reverted to his native English keep-  
left rule of the road in '36 and met a  
French truck *vis-à-vis*, with fatal results.  
But in general, through some serial and  
seemingly miraculous dispensation of providence, the Reaper's scythework scored  
near misses rather than kills.

Typical of such feeler-gauge escapes was  
Ford driver John Whalley's 1936 mishap,  
somewhere in Sweden as far as I remem-  
ber. He drove at seventy through both  
gates of a closed railroad crossing in the  
dark; the crew volplaned one way, the  
V8's chassis stayed on its wheels in the  
road, the body flipped over an adjacent  
hedge. Nobody was hurt.

Humphrey Symons, the prototype  
Grande Vitesse of the London Motor and  
a consistent rally competitor, had an extra-  
ordinary deliverance at an Austrian rail-  
road crossing one year. It was pitch dark,  
the intersection was unlit, the road was ice  
coated. Ready for snow in the mountains  
ahead, Symons was carrying six-foot skis  
for attachment to the front wheels of his  
Essex sedan—a common item of rally *son-  
dertaille* at this period. For convenient  
transportation the skis had been lashed  
vertically to the runningboards, one each  
side of the car, just ahead of the wind-  
screen. The railroad crossing barrier was  
the kind consisting of a wooden pole, about  
six inches in diameter, that swings up to  
let road traffic through, down to stop it.  
It started to come down when Humphrey  
was seventy yards away. He braked, use-  
lessly, and it began to swing up again. So  
he changed his mind, accelerated. Simul-  
taneously the *superleggera*-brained boom  
operator changed his mind too and put his  
toy into reverse. Descending with awful  
force, it struck the curved toes of the skis  
and was deflected a few fateful inches  
from its designed arc. Smashing down on  
the steel turret of the car, it locally low-  
ered the headroom by nine inches and  
brought the rig to a standstill faster than  
any brakes ever dreamed of in Hudson-  
Essex philosophy. Before the bemused  
Britons could stagger out, a freight train  
gallumphed through under a full head of  
steam. It missed the trunk by less than  
three feet. If it hadn't been for the skis the  
pole would have fallen astride the hood

and halted the car right on the tracks.

The 1931 event was decided on a brake  
test—this was pre-wigglegoggle—and it was  
characteristic of Donald Healey, rallyman  
emeritus of his generation, that he won  
the test, and with it the whole rally, on  
three-quarters of a braking system. A few  
hours out from Stavanger, Norway, his  
starting point, he'd rammed a telegraph  
pole in his open 4½-liter Invicta, lopping  
it (the pole) clean off at around knee  
height. The shunt reshaped his chassis to  
a rhomboid and put one front brake ir-  
reparably out of action. Mileage still to  
cover, nearly all of it over ice and snow,  
was 1700. Then, by way of an *anguis in  
ulcere*, a waltzing Delage hit Healey in the  
tail in the wilds of Scandinavia, smashing  
his gas tank. This happened, by a remark-  
able piece of luck, within scouting range  
of a rural tinbasher who quickly ran up a  
replacement tank that was better than  
the original — bigger and higher in the  
ground clearance. Stavanger crews at large  
had been taking such punishment that  
Donald was still no further behind schedule  
than the generality after this second set-  
back; so he pressed on, delicately humoring  
what had become virtually a four-track  
vehicle, to Monte. Even he probably  
couldn't explain how, with one front  
stopper defunct, he managed to beat the  
entire field in the vital braking test. It's  
true, of course, the Invicta drums were  
bigger than some of his rivals' complete  
wheels.

The 1939 rally, milestoning the end of  
a picturesque era, is remembered for two  
pleasant touches of the bizarre. Sammy  
Davis, epitome of the sport's-the-thing  
school that views such practices as pro-  
tests with scorn and contumely, broke the  
rule of a lifetime and filed an official ob-  
jection: he protested against the decision  
that he'd won his class in the coachwork  
contest, contending the prize should go to  
another and more deserving entry. The  
organisers overruled him so he settled it  
by simply refusing the award.

There wasn't any argument, on the other  
hand, about the allocation of the first  
prize in the rally itself, although two  
French crews, one with a Hotchkiss and  
the other a Delahaye, had not only tied  
on the road but tied again in two elimina-  
tors at the finish, to tenths of a second.  
This one they settled by sawing the big  
cup in half, plinth and all. —dm

## Coming Next Month

### THE 1960 YEAR

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manufacturers.





## The Piston Engine's Last Great Ride?

from page 37

The next time the car ran was at the Bonneville National Speed Trials, held between August 23 and 29. On the 24th Mick made an effortless run at 266 mph. The next day he was on the Salt early. He took off, shifted out of low at about 210 mph. The engines pulled with a healthy note until, at about 315 mph, he shoved the cogs into third. The sound kept booming back across the white expanse and, after an interminable wait, shut off. The recorded times were completely off of Otto Crocker's conversion charts. An awed, silent crowd waited for the calculations to be made; finally a jubilant "three hundred and thirty-two miles an hour" rang out over the P.A. Mobil's Frank Meunier rushed a wire: "You have done in two days what John Cobb took two months to accomplish. Congratulations."

But this run had been no picnic. When Mick triggered his parachute brake it took hold, then began whipping. It yanked the car from side to side and the pendulum motion became more severe until the car pulled diagonally across the course and went into a terrifying 700-foot slide.

Said Mick, "If that's all we can do, we're through."

Said Goodyear, "There are black marks on the Salt but the tires are as good as new. They can go again!"

Mick had his 'chute brake redesigned. Instead of a single 5 foot 9 inch chute on a 40 foot lead he used two such chutes at the end of a 75 foot lead. The next time he ran the 'chute-braking was flawless. He clocked 362 mph and rolled into the pits with the grin of the happiest man on earth. "We made that run on half throttle," he claimed. Mick was within 32 mph of the LSR, on an 8 1/2 mile course. With gobs of throttle in reserve and with a 12 1/2 mile-course waiting, he had the LSR wired.

"That's it for now," Mick announced. He did not make his assault on the Cobb LSR at this time for good reason. Months before, Bonneville Nationals had applied for FIA recognition of its record runs but red tape consumed more time than was available. If Mick had gone 600 mph it still would have been recognized only within the domestic fraternity. So he retired to wait for the USAC timing facilities which would be available on the Salt in mid-September.

But the directors of the Nationals came to Mick and said, "Buddy, we've done everything in our power to help you. You can do something for us. Give us a new Nationals record."

"Well sure!" Mick said. "How fast do you want me to go?"

"Any two-way over 300 will make us very happy," was the answer and Mick obliged by turning an effortless two-way 330.51 mph.

At this point Mickey Thompson had the world in a jug and had the stopper in his hand. Crowds surrounded him everywhere he went. His claims and promises

(Continued on page 88)

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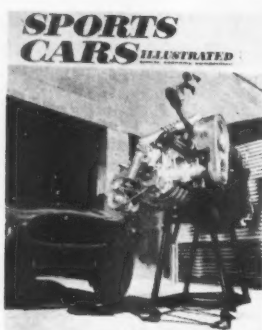
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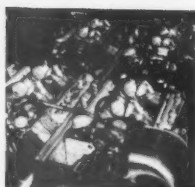
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## The Piston Engine's Last Great Ride?

from page 87

suddenly had become glorious accomplishments and Mick, overnight, was one of a microscopic elite of the fastest men on earth. Only one man ever had gone faster than Mick: John Cobb.

How did Mick wear this new mantle of glory? Were his supremely competitive instincts intensified? Did his egotism become insufferable, as might be predicted?

Quite the opposite. Towering now above his peers he became modest, courteous, gracious. With the acquisition of *noblesse, oblige* followed. Mick hastened to say, "Without the help of Fritz Voigt and all the rest of my crew—which has slaved for expenses and slim ones at that—I never could have dared to dream of doing this."



Even the ten-year-old kid who had washed engine parts in the Wendover garage got credit and Mick took meticulous care of his sponsors. After his 362-mph run someone handed him a can of beer. He was thirsty and drank it, but only after saying to photographers, "Please, fellas, don't take my picture with this in my hand." Mick spontaneously metamorphosed into the Popular Hero. Destiny was firing on all barrels.

There had been some close calls, some terrifying moments. "The big slide at Edwards AFB happened too fast for me to get worried," Mick said. "At a time like that you're completely occupied thinking about what you can do to stay out of trouble. The big slide on the Salt was a bad one because I knew well in advance that something bad was going to happen. I could feel the 'chute whipping and getting worse and all I could do was sit there and wait. The big thing at a time like this is to try to save your arms and legs, try to keep them from flying around. If you can stay conscious you can keep them pretty well under control. The 'chute finally straightened the car out and I went into a big circle and pulled the car back to where the photographers were waiting so that monkey business could get done."

"How about delayed shock reaction after it's over with?" I asked.

"I've never had after-shock," Mick said. "I'm pretty steady about that stuff; it

doesn't bother me much."

"What's ahead?"

"Well, the main thing, of course, is breaking the LSR. But even if we don't we've accomplished a lot more than people thought we could."

Thus ended the first, the easy phase of Thompson's LSR campaign. The grim part was to come.

Between Aug. 29 and Sept. 21—the date with USAC on the Salt—Challenger I was reworked extensively in the light of experience gained during the Nationals. Two of its Pontiac engines turned in normal rotation, two in reverse rotation, and it had been found that those that ran backwards developed significantly less horsepower than the others. Attempts to remedy this were unsuccessful. Two of the original four engines had had 1/4-inch stroked crankshafts, two had 1/2-inch strokers. Long strokers were installed all around.

On the 20th Mick was loaded up for instant departure for the Salt, 800 miles away. A violent windstorm came up and tore USAC's timing wire to shreds. This meant a delay of at least 24 hours for 40 miles of new wire to be procured and then strung. The tension produced by this frustration of purpose was mild but real. Then, just as the clocks were ready for operation, came a deluge of rain. Given good winds it would dry up in a matter of days. Everyone waited. Mick's crew, the USAC crew, Mobil, Goodyear, Champion, teams of still and movie photographers and correspondents from newspapers and wire services sat on their hands, day after day. There was more rain and, after a ten-day wait, everyone went home to wait for improved conditions.

The word came through on Sept. 30 that the Salt was drying fast and that clear weather was forecast through Oct. 6. After that there were continual storms in sight; this would be the last chance to run until the late summer of 1960, when Donald Campbell's turbine car would start a new era in speed on land. NOW was the last chance for a piston-engined vehicle to take the LSR. Mick and his crew rushed to Wendover, on the edge of the Salt, and were followed by a vast accessory entourage.

I spent the afternoon of Friday, Oct. 2 in Challenger I's garage, absorbing the action. The car was ready to go and the mechanics merely pattered on details of finish and final priming. I asked Voigt what the 1/2-inch strokers did for the machine's displacement and he quipped, "Hell, they make it bigger. I've never figured it."

"You want to know how big they are?" snapped Mick. "I can solve any mathematical problem in my head. Wait a second and I'll give it to you." He frowned, did some finger-counting and said, "Call it 440 cubes and you'll be within a couple of hundredths." My calculating machine later pegged the 4.06 x 4.25 V8 at 440.18 cubic inches.

Mick was tense and restless and finally busied himself with unpacking the wheel-mounted tires on which he planned to run the following day. He got the first one out of its carton, looked at it for a long moment, then hurriedly rolled it alongside one of the old, used tires which were



mounted on the car just for transportation purposes. The new tires were a full inch smaller in diameter than the old ones on which all Mick's calculations had been based. This was a catastrophe that would cost him a perhaps-critical 15 mph, that would reduce his speed from 444 to 429 mph at 5800 rpm with the gearing that he planned to run.

Mick said, grimly, "All right, we've had it. Let's see what we can do." Mental mathematics went out the door and for the next hour we slip-sticked corrections to Mick's speed tables for every gear-set in the Halibrand catalog. He still was in good theoretical shape, assuming 5800 revs and no slippage. But Mick was visibly depressed and said, "Well, we'll do the best we can."

We sat together at dinner that night and were joined by members of a New York film company who had come to the Salt to shoot a movie about Mick. "We want," one of them said, "to work up a conflict-packed sequence to illustrate your struggles and failures before achieving your life's ambition."

"Just a minute, friend," said Mick, laying a hand on the man's arm. "I've never attempted anything I haven't succeeded at the first time out." The scenario digested itself in silence.

Mick was under a steadily-building strain. During the Nationals his achievements were so easy that he went faster than he had intended to go. Head and shoulders, he was top dog among a host of top dogs.

Now it was different. The time for the moment of truth was looming. All eyes were on him, not in awed admiration but in critical assessment. Hordes of hucksters had materialized who had no interest in M. Thompson, human being. For them he was merely a situation that could be converted into media space-time. Commercial pressure was restrained but palpable. The commercial interests didn't push Mick; they just wanted what he wanted but more impersonally and with visibly growing impatience.

Mick necessarily was obsessed with thoughts of money and on Friday night he announced that he was going to sell Challenger I. An eastern promoter had offered him a good cash profit on the \$40,000 or so that Mick had in the car. The deal was based on immediate consummation; the car would be worth much more once the LSR was taken. Mick told the man to rush him a cashier's check for the full amount and the car was his.

I reminded Mick that he and the car were a team, like Lindbergh and the Spirit of St. Louis.

"Look," said Mick. "Suppose I'm wiped out tomorrow. Judy and the kids will have that much, anyhow. I carry \$25,000 in life insurance. Know what it cost me? \$1300."

There was at least one other factor in this decision. To say that Mick is a man of action is an extravagant understatement. He could go on tour with the car and make a quarter of a million dollars a year. And bore himself to death. No, there was little challenge left for him in Challenger I. He was already planning a

(Continued on page 90)



A. J. Watson builds winners...and picks them, too. Here he is with his 1959 Indianapolis Speedway Winner—his third in 5 years. Here, too, is his choice in a winning kart—A Dart-Kart Twin-700 which he picked back in May.



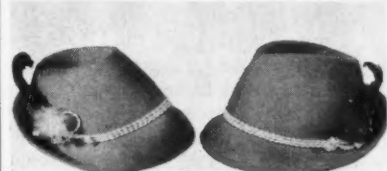
How good were his predictions? The answer is in the track records set by Dart-Karts throughout the summer—then in September, Herb Rupp won the National Grand Prix at Allentown with another Dart-Kart Twin-700.

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The Piston  
Engine's Last  
Great Ride?  
from page 89

500-mph LSR machine. He wanted to be building it now; it would take all he could get out of Challenger I and a great deal more.

Saturday morning a Goodyear crew flew in with a set of new tires that were fresh from the test machine in Akron. They explained that the smaller diameter of the tires already in Mick's possession was an improvement over the original design and that they would grow to the same O.D. That area of concern was erased.

In late afternoon the USAC clocks were tested and ready. The Salt still was slushy at the extremities of the course and both USAC and Mick agreed that only easy trial runs should be made this day. Mick made one healthy-sounding northbound run just after sundown, clocked 337 mph in the kilometer, then hauled the car back to Wendover for modifications.

Here began a desperate, dogged regime of labor that continued almost without interruption until the crew packed up the night of the sixth. One member who had kept track of his sleep assured me on Monday night that his total sleep time since the previous Wednesday had been 14 hours. I saw no reason to doubt this. The men were up around three a.m. and worked straight through until midnight nearly every day. Sunday was an exception in that Mick chose not to run, to give the Salt additional time to dry.

Before his run on Saturday a stranger came up to Mick and asked if he were a Catholic. Getting a negative answer, he handed Mick a beautiful St. Christopher medal and said, "I've carried this for 30 years and I know it's helped me. Do me a favor and carry it in your car."

No one who lives in the jaws of death can take a flippant attitude toward such things. Mick thanked the man, took his offering and passed it to a Catholic member of the crew, asking him to install it. "Mick," the crew member said, "we had one of those taped to the roll bar while you were still building the frame. We're thorough."

Actually, Mick had become increasingly religious as Challenger I took shape. "I pray before every run," he said. "Not for myself. I pray for Judy and the kids. I ask the Lord to spare me for them if He thinks they'll need me. I try to hear His advice on when to run and when not to."

Monday we all were up at 4:30 a.m. and on the black, moonless, almost frozen Salt an hour later. This was going to be the Big One. I manned a USAC observer's phone at the lonely five-mile marker and at 6:29 came the word that Mick was being buttoned into the car. At 6:31 he was pushed off and on his way. Across the five miles of emptiness the airplane-like roar of his engines carried clear and strong. He got on the throttle hard, there was a slight hesitation, then he came streaking down the Salt faster than I'd ever seen a vehicle move. Then, in front of me, he

shut off and went whistling below the northern horizon. From his start to the ten-mile light took a little over 70 seconds. Three minutes later came the word: "Mickey has trouble and is taking the car back to Wendover. Come on in; that looks like it for today."

When I saw Mick 20 minutes later he looked haggard and shaken—an almost unheard-of thing. "If we had any sense we'd quit," he said. "It's a horrible thing, drag racing over that course with its slush and ruts."

He had drifted slightly off course at about 220 mph and had clipped one of the laths driven in the Salt to mark the course. Fragile thing that it was, at that speed it was enough to bash in the left front of the streamliner's aluminum shell. But Mick scarcely lifted his throttle foot, brought the car back on course and kept accelerating fiercely. Jolting over a short, slightly rough section at about 340 mph the car's underpan came loose at the rear and began to bounce and drag. To Mick the sound suggested a disintegrating tire (a lethal thing) and that's when he got off the throttle. The underpan was ground through as though by a disc sander and, in spite of the salt's wetness, its paint was obliterated by the friction's heat.

During that run an old friend joined me at the mid-course outpost, bearing a Thermos full of life-saving, scalding coffee. He was courtly, gentle Capt. George Eyston, three-time holder of the LSR and a glaring exception to the pattern of the ultimate-recordman as an obsessive type.

When Mick had passed Eyston said, "Well, do you think he'll make it?"

"The odds look good," I said. "Another 40 mph and he'll have it and he's scarcely begun to nitrate his fuel."

Eyston gave me a sad, somewhat pitying smile and made no reply. His old record was 357.5 mph. In all the world he alone had intimate knowledge of the power it takes to add each mph at such velocities. Mickey was finding out.

He didn't quit as he said he should. You could sense that his ambition, as far as this car was concerned, was no longer gnawing at him, although he still wanted and needed the LSR in the worst way. And, in place of the rolling-off-a-log ease of his Nationals runs, a streak of trouble seemed to be building and everyone felt it. But Mick had made commitments to the people who had helped him most and he'd unhesitatingly risk his life to make them good. Skies that had been cloudless became murky, adding the pressure of threatening weather to the emotional purgatory in which Mick must have been living. Again he and the crew slaved all day and night. They repaired the damage to the body and, again, juggled gear ratios. The car's combination changed daily.

Tempers among the exhausted crew had become frayed and there were flare-ups between Mick and his men. Voigt's unconquerable deadpan humor alone kept *esprit de corps* alive. He told a reporter from the wire services, "We don't wear the car out running it; we wear it out taking it apart and putting it together again. Print that and the boss will demote me from Crew Chief to bird-dogger."

Tuesday morning the crew staggered out



of bed at 2:30. Mickey, in his hot station wagon, had always beaten the gutless supply truck to the Salt, then nagged the crew for being late. This time they'd get one-up on him. They'd get there early and say when Mick arrived, "There she is—already warmed up for you and ready to roll. What hung you up?" They tired but never slacked their effort.

Again in the blackness of night we took our posts on the Salt. Scarcely a breeze stirred and the surface was hard and dry. Conditions were ideal and, at about 6:40, we heard over the wire that Mick was about to start again. He came howling down the course, sounding magnificent, and, at about 200 mph, he threw a shift. The gears wouldn't mesh. Three times he blipped the engines to a banshee wail but the shift wouldn't take. He coasted north and minutes later the message came from the timing stand, "Come on in. They've got a couple of hours' work to do in the north pit."

It was an unbelievable sight, the speed with which Mick and his boys pulled the body off the car, then the elaborate fuel system, then the front axle, then the right-front transmission. Voigt tore it down with the help of a pair of snap-ring pliers that he deftly built on the spot. He located the burred gears that wouldn't mesh, ground them smooth using a portable generator that was conjured out of thin air. Then the crew swarmed around the car again; it grew like a stop-motion movie sequence.

The clouds overhead thickened during this madness and USAC boss Art Pillsbury (he's timed every LSR attempt on the Salt) came to where Bonneville Nationals director Willie Davis and I stood.

"Listen, guys," he said. "You know Mickey and he'll listen to you. If I try to tell him this he may think I'm trying to dictate to him. He's trying to wipe out all the records in just two runs. It's too hard on him and the machine. If he just goes after the World Records from the five kilo to the ten mile he should get them in a breeze. With those secured he will have accomplished something big and permanent, everybody will feel better and then he can just concentrate on the kilo and mile."

Capt. Eyston had joined us during this discussion and added, "Oh, yes, yes. That definitely would be the best procedure in view of the weather and all."

We agreed with this expert counsel and braced Mick with the idea. His face lit up radiantly. "Sure," he said. "I can do it just stroking. Do this for me—sell it to the company people."

We piled into the Nationals pickup and sped across the Salt to find the commercial sponsors' spokesmen; we were elated by the obvious relief of Mick's tension that this proposal had wrought. Also, we were beginning to doubt that he could go 400 mph. The commercial people, however, wanted the big record first. Only one required no selling: Mobil's Roger Mahey said, "Of course. That will give us plenty of birds in the hand and take an immense load off of Mick."

At 11:55 that morning Mick took off on

(Continued on page 92)




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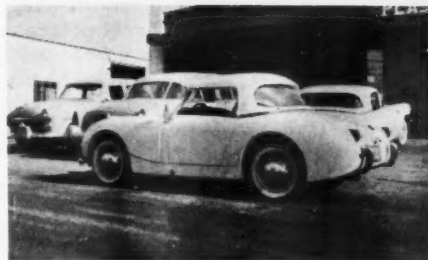
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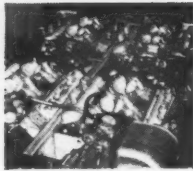
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## The Piston Engine's Last Great Ride?

from page 91

his southbound run, gunning for absolute, unlimited records which had stood for 20 years. Cobb had set them in '39, didn't break them when he set the existing LSR in '47. Down and back the car ran with the ease and perfection we had seen during the Nationals over a month before and the four World Records toppled.

Mick's fastest one-way time was 367.83 mph, clocked in the one-mile trap. His rpm vs. mph charts exceeded 460 mph but they and the Isky dream-wheel that he consulted constantly omitted the monumentally significant factor of wind drag. His splendid record-smashing runs were made using a ten per cent blend of nitromethane fuel. When he told the Mobil fuel crew, "Mix me some 40 per cent," he had a full and weary appreciation of the amount of wind he was pushing and the immense horsepower he would have to have to push it 30-odd mph faster. But the time for decisions was a year ago. Now Mick could only act out the destiny he had decreed for himself.

The overcast was dense, the air cool, the Salt still dry, hard and ideal. I left the phone, went to the north pit and helped ready the car for the big attempt on the kilo and mile. Voigt's engines, as usual, required only routine attention. We changed the 32 spark plugs (each was analyzed microscopically by Champion's Dick Jones), replaced the hot coolant with cold water, added the hotter fuel. At 3:30 in the afternoon Mick made his southward run and, at the mid-point of the course, we could see that he was going no faster than before. We piled our gear into the Mobil DC-3, having witnessed what probably was the piston engine's last gasp in the arena of ultimate speed.

As Mick flashed over the Salt on that final run, the tube that fed his oxygen mask came adrift from the oxygen bottle which was mounted behind the car's seat, forcing him to breathe the mingled toxic fumes of oil, fuel and exhaust which pumped through small openings in the firewall. He fought to hold the car and his consciousness until he could trigger the parachute brake; he was in a coma when they lifted him from the car. If he had not tripped the chute he would have crashed against the raised dike of the highway.

When Mick came to he was delirious, shouting, "Get the car ready! How much of the hour have we lost? More nitro!" But he was restrained and the car was winched onto the trailer.

Minutes later we, airborne, made a steeply-banked turn around the south pit. In the subaqueous, premature twilight our last view of the Salt was of a minute, slender, blue vehicle. Beside it was a tiny figure clothed in black—Mickey's leathers—waving us good-bye. Then a light rain fell and a strong wind rushed out of the south, driving pooled brine across the course. Winter took possession of the Salt.

—g b



## The Will To Power

from page 27

must remain in control of his other faculties. But this control by the mind, if it exists at all, it is always extremely shaky because of the psychological unbalance caused by driving.

The worst of all this is that two other factors in driving encourage anti-social conduct. They are the feelings of impunity and anonymity. The feeling of impunity is heightened by speed and by that mastery of speed which enables a driver to flee the scene of a "crime" if he wants to.

The driver feels completely anonymous on the road. While he is tagged and labeled in daily life in terms of his social, professional and family life, here he is a mystery man without a name or a face. No one knows him, no one recognizes him—and nothing, therefore, short of the police, can prevent the veneer of his conduct in society from falling away as if by magic. This feeling is all the more acute because everyone else is anonymous. Pedestrians are only fleeting silhouettes and the other drivers hidden inside their cars are nothing more than a part of the machines they are steering. As a result, it is impossible to achieve that personal contact which is the very basis of life in society, because other men have lost their status as persons. How can you establish relations with these faceless creatures? The highway becomes a sort of jungle where it's every man for himself.

This regression into the most primitive phase of human life can also bring about a purely magical conception of the universe. Alone behind the wheel, man must confront obscure forces which occasionally are on his side but which, most of the time, go against his will. Michel Roche, a French social psychologist, observed while making a study of accidents that 90 per cent of the drivers he interviewed touched wood when he asked them if they had ever had an accident. In other words, rather than being the fault of a person, the highway accident appears to be a tragic expression of the will of Fate. But fortunately there is St. Christopher, the patron saint of travelers, to protect the driver against this fate. Men who never set foot in church suddenly become devoted to him when they get into their car.

As egoistical as a child and as superstitious as a cannibal: is the motorist really such a monster? Let's say that he can become one, but not necessarily. Driving a car always creates a certain amount of unbalance which encourages the appearance of such characteristics, but the amount of unbalance varies considerably with the individual.

It varies by sex: the urge for power is the expression of a basically virile instinct which is much more highly developed among men than among women. On the whole, women at the wheel have a much less competitive attitude and, therefore, they are not as aggressive. Their distaste for anything mechanical—which often goes as far as repulsion—keeps them from iden-

tifying themselves with a car as completely as a man.

Does this mean that they are safer drivers? Not quite. While it may be psychologically dangerous to identify yourself with a car, this identification does give a driver quicker and more confident reflexes and also encourages him to pay more attention to what he is doing. It is easier to make a woman take her mind off her driving because, to her, driving is not an all-devouring passion. This is all the more dangerous because a woman's highly developed emotionalism makes her more vulnerable in the event of sudden danger. When a snap choice has to be made at the wheel, a woman often "freezes" and delays her decisions longer than a man. A survey of drivers in the state of Connecticut showed that women have relatively fewer serious accidents on the open road. But in city driving they cause other drivers to have more minor accidents because they disconcert them with their feminine tactics.

Conduct at the wheel also varies according to age. American studies seem to show that drivers are most aggressive between twenty and twenty-four—the period when accident risks are greatest. At this age, reflexes are at their peak, but they do not compensate for a lack of safety-mindedness, much less a particularly pronounced degree of aggressiveness. According to certain authorities, this aggressiveness is explained by the fact that a man has to make a certain number of vital choices during the early years of adulthood which place a heavy strain upon his emotions: earning a university diploma, deciding upon a career, choosing a wife, etc. If a man meets a few serious setbacks after making such decisions, he will feel deeply frustrated—and his frustration will generate aggressiveness which is easily revealed in the way he drives.

The influence of emotional frustration upon drivers has attracted the attention of psychologists studying chronic violators. Statistics show that only a very small percentage of drivers are responsible for accidents. An investigation carried out over six years in Connecticut revealed that only 19 per cent of the state's drivers were responsible for all of its accidents. In addition, 4 per cent of these drivers had been involved in more than two accidents and were responsible for 36.4 per cent of all accidents. Another study, made in Chicago and covering more than 40,000 drivers, led to a second conclusion: the more accidents a driver has had, the more chance he has of having others. The study revealed the following picture:

1 driver out of 40 with one accident had a second.

1 driver out of 10 with two accidents had a third.

1 driver out of 5 with three accidents had a fourth.

3 drivers out of 10 with four accidents had a fifth.

2 drivers out of 5 with five accidents had a sixth.

What is most serious of all, according to the Chicago study, is that the number of accidents for which a driver is not responsible increases with the number of accidents he himself has caused. The prob-



tem is no longer to determine if a driver causes accidents but to learn why there seems to be a handful of accident-prone drivers who seem to cause nearly all accidents, whether or not they are legally responsible for them.

Another study, carried out in Canada, sheds some amazing light upon this question. Forty taxi drivers, twenty of whom had had a number of accidents and twenty of whom had had almost none, were asked detailed questions about their past. The study brought out that the drivers who had suffered from a shattered home during their childhood were mainly in the accident-prone category: among this group of twenty, six had divorced parents, as compared to only one among the safe drivers. Eleven of the dangerous group had suffered from childhood phobias of some sort, as compared to five among the others. Twelve of the former had been unruly pupils in school, and only two of the latter. Plunged into misfortune by their childhood frustrations, the chronic violators were never able to straighten themselves out. Eleven of them had been punished frequently during their military service, as compared to only one among the safe drivers. Ten had already been fired from jobs, as against only four of the

second group.

The results of this detailed study of a small group of drivers seem to agree with the conclusions of investigations on a bigger scale. Most drivers who cause accidents come from the ranks of social misfits who are basically victims of a loveless childhood and a neglected education. In daily life as in driving, they are handicapped by frustrations which make them aggressive—and therefore likely victims of highway madness.

Aside from true social misfits, any man who is emotionally frustrated, either temporarily or permanently, tends to take his aggressiveness out on his car. Driving a car, as we have seen, is almost ideal for this. The hen-pecked husband, the man no one understands, the business failure or the oppressed clerk tries to take his revenge at the wheel. There, at least, he feels he is everyone's equal. He's just as strong as the others, or even stronger—and he's going to prove it because his wonderful machine enables him to terrorize pedestrians and to lord it over other drivers on the road.

Except for the dangerous pleasure of driving with a girl friend or after drinking, the automobile rarely offers pure pleasure unmixed with irritation. Then how can a driver be happy in his car? Perhaps, and

this may be the answer, by not trying to be too happy. The car plays a big role in the emotional life of many people because they have no other form of relaxation. This is not very healthy. The driver will be better off if he has different forms of relaxation instead of just one.

Finally, and most important of all, the motorist must adopt his own moral code founded upon the following principles: even though other drivers cannot be identified behind their windshields, they are nonetheless human beings and, secondly, aggressiveness is an admission of inferiority which is revealed in childish or primitive conduct. This last point is all the more important because it holds true not only for individuals but for peoples as well. For example, some of the most mature drivers in the world are to be found in England. Not only does the English motorist try not to annoy other drivers, but even informs them obligingly when they can pass him. His aim is to fulfil his responsibilities as a citizen and a driver in a courteous and very thoughtful manner.

By rising above the law of the jungle where blind aggressiveness is king, the civilized driver keeps perfect control over himself—which is, after all, the prime requisite for pleasurable driving. —TdQ



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**Brabham**  
from page 39

wealth drivers of the top class, and probably only equalled by Tony Brooks. About the only dissenters from the we-love-Jack in chorus are English racing mechanics, whom Brabham, with native frankness, once compared unfavorably with their Australian counterparts in a magazine article.

Since the demise of the prewar tradition that cast the supposedly typical British racing driver for the role of a hard drinking heathen, devoted to polygamy in picturesque forms and creating disturbances while in liquor, the barometer of conduct in this sector of society has countersung to an almost monotonous reading of Blameless. Brabham, it's our duty to record, runs true to modern type. As a constant foil for the unique brand of wit that marks John Cooper as the four-star comedian of the English and continental racing scene, Jack has abundant scope for the viceless horsing that comes naturally to him, but it goes no further than that. His humor is never unkind and its target is often Jack Brabham. He doesn't smoke, doesn't drink. "I gave 'em both up when I left school". An affectionate father, he returns from every foreign racing sortie laden like Santa Claus with gifts for his kid. Sometimes these are so bulky he has trouble persuading the airline to accept them as personal baggage. Betty Brabham accompanies Jack to most of his races, abroad as well as in Britain, and looks after his timekeeping for him.



For the record, in chronological order, here's where and how Brabham amassed his pre-Sebring total of 31 points in the 1959 World Championship:—

**Monaco GP:** First, at 66.74 mph, ahead of Brooks (Ferrari) and Trintignant (Rob Walker's Cooper-Climax); also fastest lap at 70.09 mph and first-ever race lap at above seventy. 9 points.

**Netherlands GP, Zandvoort:** Second, 14.2 seconds behind Bonnier (BRM) and 1' 8.8" ahead of his Cooper works team mate, Masten Gregory. 6 points.

**French GP (GP d'Europe), Rheims:** Third, way behind Brooks and Phil Hill. 4 points.

**British GP, Aintree:** First, 22.2 seconds in front of Moss (BRM) and followed by Bruce McLaren, number three on the Cooper team and Jack's personal protégé. 8 points.

**German GP, Avus:** Brabham broke his clutch in the first heat, didn't start in the second. No take.

**Portuguese GP, Monsanto:** Crashed. No take.

**Italian GP, Monza:** Third, behind Moss (Cooper-Climax) and Phil Hill (Ferrari); 25.8 seconds down on Hill. 4 points.

To anyone who follows the grand prix circus intelligently, even vicariously through the race reports of such knowing writers as *SCI's* Jesse Alexander, the London *Motor's* Rodney Walkerley, *Autocar's* Peter Garnier and *Motor Sport's* Denis Jenkinson, it's obvious Jack Brabham is not the best road race driver in the world. He still won't be if he becomes 1959 World Champion, and he'll be the last to deny it. But in England in particular, in the eyes of a million or two cursorily interested followers of the sport who base their opinions on grand prix reports in popular newspapers, Jack's rating has suffered indirectly and unfairly at the hands of a specter known as the Moss Jinx. Having conjured this genie out of its bottle of printer's ink, its creators plug it to a degree that's become purely ridiculous. If Moss wins, God's in His heaven and all's well with the World Championship; if he loses, *cherchez la Jinx*. In races that have been won by British or Commonwealth drivers other than Moss, this ubiquitous and iniquitous Jinx has often hogged the headlines to the exclusion of the winner's exploit.

If and when Brabham (for instance) crashes or blows up through no fault of his own, the glamor-drunk scribes of the lay press don't pump him for the story of his hoodoo's latest treachery, for he doesn't have a hoodoo accredited to him. And because, as Smollett put it, "True courage scorns to vent her prowess in a storm of words", it's for sure the publicly reticent Aussie won't take the trouble to spell it all out for the reporters' benefit.

Granted, if everything had gone right for Stirling throughout '59, always, he'd have gone to Sebring with better than 25 1/2 Championship points to his credit. By the same token, though, if everything had gone right for Brabham, his pre-Sebring total would have been better than 31. But let it be understood this interpretation of events is entirely our own, and not inspired by anything Jack says or even hints at. In matters of racing strategy and tactics, his thinking and Stirling's often have an uncanny similarity, and Jack is a sincere and overt admirer of Moss.

For practical proof of his feeling towards the man who was to chase him up the 1959 Championship ladder, it's only necessary to recall an act of Samaritanism during the New Zealand GP meeting at Ardmore last January. In his heat, Moss broke one of his Cooper's halfshafts and suspension units. The mangled parts were beyond local repair and, having no replacements of his own, it seemed he'd have to sit the final out.



Brabham had replacements, though, and unhesitatingly came across with them. Stirling won the final, Jack placed second.

You'd hardly think a catalog of it's and but's, relative to Brabham's 1959 Championship progression, would need to include the Monaco GP; he won the damn race, after all, and also broke the lap record, and you can't do much better than that. Well, not *much* better, maybe, but in fact, if it hadn't been for a transmission derangement which, as far as we know, hasn't hitherto been mentioned anywhere in print, he might well have made it a 100 percent score by beating Maurice Trintignant's 1958 race record of 67.98 mph. At around half distance, bottom gear on Jack's Cooper started jumping out. Thereafter he only used low briefly and intermittently, when Brooks was leaning on him unbearably. Preeminently, of course, the Monaco circuit, shortest and slowest of the *grande epreuve* venues, is a place where it really hurts to be bereft of bottom cog, with the alternative of driving one-handedly to hold it in. Nonetheless, it was as late as lap 85, fifteen from the finish, that Brabham set his terrific 70.09 mph lap record.

In the second title round at Zandvoort three weeks later, he'd no sooner taken the lead from Jo Bonnier (BRM) on the thirtieth lap when his second gear went up the spout. That left 45 laps to race with an excruciatingly wide ratio box. So it was legitimate for Brabham apologists to speculate whether, if this hadn't happened, Bonnier would later have passed (to win), or Moss would have passed (to retire twelve laps from the end with malfunction of his Cooper's Colotti gearbox).

Jack's third placement in the European Grand Prix at Rheims, where the Ferraris of Tony Brooks and Phil Hill headed him, calls for no excuses or qualifying clauses: except perhaps to fill in a gap in the contemporary reports—even the good ones—by saying the reason why Brabham surrendered second place to Hill at around lap 26 was that Jack's clutch had started slipping. The shortage of friction persisted for ten or fifteen rounds.

It was during practice at Rheims, you'll remember, that Cooper tried out their aerodynamic body on both of Jack's cars—the works F1 machine and his own 1½-liter that he ran in the F2 race. This shell, with a sawed-off tail based on Kamm principles, gave the full grand prix contender a top speed of around 190 mph on the straight, but it was also indirectly responsible for Jack's retirement in the F2 contest, despite the fact it was replaced by an open-wheel body before either race came off. The reason was simply that the lack of brake ventilation during training had given the smaller car's brakes such a cooking they wouldn't stand up to the race session.

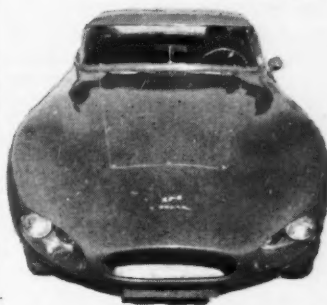
A secondary reason for his F2 defection was that, under the hottest race conditions ever recorded in a European classic—ambient temperature 95 degrees F, surface temperature 190F—Brabham became as badly detuned physically as anyone in the act. Even in Australian races, he'd never

(Continued on page 96)

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Brabham

from page 95

had it that hot. Like most of the rest, he copped his share of face lacerations from stones thrown up from the molten road surface.

Contemporary Rheims reports mentioned a tendency for the Cooper streamliner to "lift" at high speed. This was true but not explicit. The lift was lateral, i.e. an accentuation of roll on fast curves, not frontal. Anyway, says Jack, they have discontinued development on the aerodynamic body and it probably won't ever be seen again.

The Brabham Hoodoo (if you're prepared to admit the existence of this poor relation of the Moss Jinx) took furlough from spite the day of the British GP at Aintree, Championship round four. With the works Ferraris absent due to industrial trouble in Italy, Jack led from start to finish with hardly a care in the world apart from worrying whether his tires would last out (he went through nonstop). The front pair were in very poor shape at the end. He thinks with the extra power and speed they'll naturally have on tap in 1960, Cooper may need to switch from stud fixing to centerlock wheels, anyway for some circuits, and recast their strategy to include midrace wheel changes.

Round five, of course, was the farcical German GP along the dreary flats and near-suicidal Nordkurve of the Avus—a Ferrari benefit as far as it benefitted anyone. Brabham, as recalled earlier, killed his clutch in the first heat and nonstarted in the second. It certainly isn't sour grapes that prompts him to declare he'll never again submit car and person to this sort of Roman holiday, because the successful Ferrari team men were of the same mind.

But there were bigger scares in store for Jack, who doesn't scare easily, three weeks away in Portugal. First he had to dodge a child who pitterpattered across his Cooper's bows at 125 an hour (this was the Cooper's speed, not the child's); then a jaywalking official forced Brabham into another phenomenal avoidance; finally, when lying second to Moss and all set for six vital title points, he was involved in the first really bad crash of his career. He was blamed for this accident by normally perspicacious British reporters, none of whom, it's relevant to add, actually witnessed it. In fact, by our interpretation, his only fault was that, not being clairvoyant, he failed to foresee that a Portuguese driver, Cabral (Cooper-Maserati) would suddenly change his line on a corner when Jack, coming up fast from behind, was too far committed to play it contrapuntal.

The fact that Cabral was driving for the experienced Scuderia Centro-Sud made it presumable he knew what he was doing. Brabham's car hit a telegraph pole and threw him out. As he landed he just missed being flattened by Masten Gregory's works Cooper, which finally placed second to Moss on Rob Walker's Cooper-Climax entry.

Expectedly, in view of preceding revelations, the story of Brabham's bid for the Italian Grand Prix yields a significant now-it-can-be-told item. Cooper had had special gears made up in advance for Monza. During practice, however, due to a fault in heat treatment, their teeth started coming out in handfuls, forcing the team to fall back on cogs giving painfully low ratios for this very fast circuit (lap record by Phil Hill, Ferrari, 128.12 mph). Speed for speed in top, Jack's rpm was 500 up on the planned turnover, and the same went for his team mates, McLaren and Scarlatti. So it's fair to comment that Jack, who finished third behind Moss on the Walker stable's Cooper-Climax and Phil Hill (Ferrari), not only did well to make his tires last the 259 mile race distance (which Stirling also did but the Ferrari team didn't), but furthermore nursed his overrevved engine through without mishap.

By common consensus, Brabham's self-taught knowledge and skill as an engineer start where that of most of his grand prix contemporaries leaves off. Knowing cars as he knows them, and never racing one he hasn't worked on with his own hands (sports cars excepted) is, he considers, a double-edged asset. On the one hand, enabling him to foresee impending crack-ups, it can be the means of turning a probable retirement into a lame finish—which is better than no finish where Championship points are at stake. On the other hand, in the same situation, a less sensitive operator will keep his clog down and conceivably bash through a high placement. It doesn't always pay, in other words, to know the worst that may happen.



Brabham, if he wins the '59 title, will be the first Champion in history with the distinction of having built and played an important part in the development of the cars he races. He could be classified as the polar opposite of the late Fon Portago, who, rest his soul, was about as much use in a workshop as a left handed gorilla and didn't even like cars much, and the approximate counterpart of the great and equally lamented Frank Lockhart. His gifts as an engineer were doubtlessly congenital, but he attributes their practical development to the fact that in Australia, back in his dirt track and hillclimb days, the business was so unprofitable he had no option but to be his own mechanic.

Things looked up a bit when Jack secured a Redex sponsorship for a road race program with the front-engined Cooper-Bristol he was operating in N.S.W. and neighboring States in the early 'fifties.

Then, at the end of 1954, the Confederation of Australian Motor Sport outlawed sponsorships, which was a contributing factor in Brabham's decision to go to England in '55—"just for one season". He was so sure the sojourn would be temporary he bought a building lot in Sydney with the firm intention of setting up there in a garage business. Little did he think his garage venture, when it finally materialized—five years later—would be located just down the road from Cooper Cars Ltd. at Surbiton, England.

Jack recently sold his piece of Sydney and, except for occasional trips to visit his father there, isn't likely to be seeing much of Australia in the future. After Sebring he heads straight for New Zealand and the N.Z. Grand Prix in January.

Incidentally, any nostalgia he feels for his mother country does not include the national motor sport authority. Aside from the Confederation's action in virtually depriving him of his means of livelihood in his native land, there was another little contretemps. In 1951, totally inexperienced in speedwork on a hard surface, and coming straight from the 'disreputable' sport of midget car racing on dirt tracks, he surprised all beholders by making outright fastest time in his very first hillclimb—driving one of them heathenish midgets. Authority then stepped in and disqualified him on the niggling technicality that he was running without front brakes. The following year he satisfied scrutineering honor by fitting front brakes and promptly won the Australian hillclimb championship. What the scrutineers didn't notice was that his front brakes weren't connected. Nowadays the Confederation is proud to have 'fostered' a potential World Champion and sends him fulsome cables to this effect.

Arriving in England in the spring of 1955, Jack acquired an out-of-breath Cooper-Alta from the late Peter Whitehead and, in the memorable Ustinov phrase, leapt into obscurity. Cars that followed, *chez* Brabham, included the old 250F Maserati with which the Alfred Owen stable used to console itself for the BRM's lack of success, but this one, in the village blacksmith's hands, never really regained the form it had shown when Peter Collins drove it to victory in the 1955 International Daily Express Trophy at Silverstone. It was in 1956 that Brabham went onto the Cooper payroll, where, to shorten an intractably long story, he has been ever since. His between-race duties have included the bulk of Cooper's high speed testing and, in particular, improving and developing the cars' handling qualities. The Cooper firm has of course won the 1959 F1 Constructors' World Championship by miles from Ferrari; whether Jack does or doesn't bring off the drivers' title, he can justly adorn his hat with a few of the feathers that go with victory in the makers' contest.

We once overheard a Brands Hatch spectator say, in awestruck and admiring tones, "With Brabham you never know for sure which will come into sight first, his back wheels or the front ones". Transition from his old haymaker cornering modus came gradually, almost imperceptibly. Except for occasional lapses in the heat and fury of short races on dizzy courses like Brands Hatch, where almost everybody



resorts to wildfowling technique anyway, Jack's latterday style well deserved the adjectives "cool, immaculate", that *Auto-sport's* account of the 1959 British GP applied to it. He doesn't yet have the almost sculptured poise of Moss and Brooks at the wheel, because this would be impossible to combine with his habit of telescoping his neck into his shoulders to get himself down out of the airstream. But gone forever is the old brute-force touch that used to be such a delight to the Brabham fans of two continents.

In international F1 races of sub-Championship caliber during 1959, Brabham and Moss were constantly in each other's hair, fighting a series of tigerish battles. Coincidentally, the first and the last of these, the Goodwood 100-miler at Easter and the Oulton Park Gold Cup race in September, had the same outcome—Stirling first, Jack second. In the latter, for the biggest first prize purse of any current British race (1000 pounds, nearly \$3000), Brabham became a figure of controversy over what appeared to be a deliberate and blatant jumped start. Because nobody bothered to ask him what gave, and he, characteristically, didn't bother to tell anyone, the impression remained that Jack had momentarily reverted to blacksmith type. The fact was, and it only emerged under our crossquestioning, that Cooper had been experimenting with a new type of clutch, giving a shortened pedal travel. When Brabham realized, all in a split second, he was the only one racing for the Gold Cup, he hit his brakes hard, risking a shunt up the bustle in so doing. In the general brouhaha, this act of reparation went unnoticed. Anyway, he wasn't complaining—he'd won the cup and the accompanying thousand sterling a couple of years earlier.

Brabham is not without experience as a sports-car driver but he's happier in the *vitesse pure* school. As a short-term member of the Aston Martin works team in '58 he co-drove the winning DBR1-300 with Moss in the Nurburgring 1000-Kilometers, and shared Roy Salvadori's second place in the TT. It's been written that he is the only Australian ever to finish at Le Mans, but this should read the only Australian male; Joan Richmond, Aussie aussi, placed high in her Le Mans class when Jack was still in short pants.

In '59 his sports car program was confined to the sideshow contest for this class of car in the British GP meeting, where he was third, and the TT at Goodwood, where he retired on Monaco Coopers both times. His best "week's" work during 1959, to revert to F1 level, was winning the Silverstone International one Saturday and the Monaco GP eight days later. No doubt the shade of Peter Collins nodded approval of Jack's new-found tidiness in averaging 102.73 mph to win the Silverstone annual. Back when Peter himself won it, at 95.94 mph on the Owen Mascanti in 1955, it could have seemed that the Australian never would snap out of that village blacksmith technique.

Win or lose the Championship, Jack Brabham says he will retire from racing in about two years' time. When he does, grand prix will lose an amiable, courageous and technically brilliant figure.

—dm

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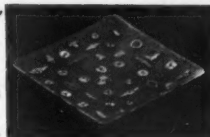
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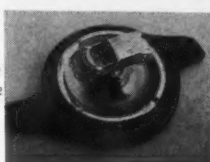
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### Eternity Begins at Dawn

from page 63

would drop the average by five miles an hour. Gus had to stay in the car and the car had to stay on the course. The three hour record had fallen to Wisdom on his next-to-last lap. The 1000 km mark fell but the main mark had to wait until Gus finished his stint. Finally the sixth hour came.

"Give him two more then bring him in," Enever told Hounslow. Alec, third finger-nail, right hand, between his teeth nodded. The other two nails were down to the quick. Captain Eyston brought back the official word: 139.09 mph for the next six hours.

Gus came in, mindful of Tommy's overshoot, bringing it down in gear and clearing it at the last moment with a blast at the throttle while Hounslow winced.

Ed Leavens, of Canada, was up next for what was, at least from the drivers' point of view, the roughest shift of all. By this time it was noon — past noon — and a merciless sun shone down from a cloudless sky. There were no shadows except directly underneath the car and other objects. The glare was blinding, the air was hot with an ambient temperature of over 85 degrees. And finally there was little glory to be gained. Only one record could fall in the next three hours and that one fairly early. The rest of the three hours was steady grind, aiming for the average. The 1000 mile mark fell soon enough at 138.55. Leavens continued to turn the circle at a desperately boring 140 mph give or take a fraction, working toward the set-up that would assure the twelve hour record come what may.

At about this point, if you're Captain George Eyston, you sit in the timer's shed with an outward calm born of years of record setting. But you keep an eye on the clock and a sensitive ear cocked for engine sounds and the pealing of the phone from an observer's post, a call that can only signal trouble.

If you're Sidney Enever you pace the pit area incessantly, occasionally stopping by the cook shack but mainly intent on sight and sound of the car. Mostly you stand in the pit shed and fidget.

If you're Alec Hounslow you've started working on the first nail of the left hand. You wonder audibly if the engine still has that crisp, clear note it had at dawn. Is it your imagination or has that sharp, biting rasp turned a bit feathery?

If you're any one of the thirty-odd people gathered in the pit area you feel the tension build.

Somone says: "That's an awful little engine to lug all that weight that fast." You just look at him and he shuts up. He's right, of course, but you just don't say it. Not out loud.

By now the sun starts slanting in from the west. Shadows grow, black against the glaring salt. The air seems hotter than it is and the wind has dropped to near zero.

Now it's three-forty-five, time to bring Leavens in. Wisdom buckles on his crash

hat. The crew gathers. Any action will be a relief.

Ed cuts it clean and far out, coasting silently in, the only sound the crunch of tires pressurized with nitrogen to 50 pounds crushing the hard salt. Quickly 25 gallons of fuel flow into the tank, a quart of oil goes into the sump. Down with the lid and cockpit cover and Wisdom is out once more, this time for the final two and a half hours that, if all goes well, will boost the 12 hour Class G record by 20 miles an hour.

The atmosphere now is slightly reminiscent of a bomber base sweating out a mission. There's nothing to do but wait. It's all up to Tommy and the car.

The minutes trudge by on leaden feet, slogging slowly into the eleventh and final hour. The eleventh hour! You can't help it — you recall all the things that killed victory in all the races you remember. If you're Eyston, Enever or Hounslow you remember the last half of the last lap of a record run with this same car when a tire tread let go, snatching certain victory away. You remember Stirling Moss at Monte Carlo in 1959 with the race all tucked away and stroking it when the gearbox packed up in that last hour. These and hundreds more stretching into racing antiquity all march through your head. It doesn't help. Not a damn bit.

Then the phone jangles.

The round little man who is the official pit observer answers. He, who alone among those in the pit seemed unconcerned before, literally yanks the instrument off its mounts. A big grin lights his face.

"You're in," he says, hanging the horn back up on the wall. "He can push it in now and you've still got the record. If he stopped now and pushed he'd still have a 122 average."

Tension drops for an instant.

Fine, you're in like a porch climber. But you didn't come out here to win by a fluke. The record is in; it's on the books but Tommy doesn't know it and to hell with technicalities.



So you sweat some more. The last half hour rolls around, then, agonizingly, the last few minutes.

Whoom! go the tent walls and Tommy is on the last lap. The 12 hour record is now 138.75 miles an hour average.

Eternity ended at 6:20 p.m., September 9, 1959.

But not anxiety. EX 219 still had two more jobs to do.

There was still a one-hour run on the circle and a dash down the straight to be done. All the one-hour standing start records were held by Lotus and all were 140



miles an hour or better except the one hour record itself which stood at 137.26. The dash down the straight and back was intended to take Lt. Col. A. T. Goldie Gardner's flying start five-mile mark which had stood at 144.6 since 1937. Other marks aimed at were the flying 10 kilometers and flying 10 miles.

All this was to be done with a second engine, a little more fierce than the 12-hour machine but basically the same. A little richer running, burning a rather nasty blend of fuel and twisting a little tighter — that was the difference. This time 99 horses lived where 35 belonged.

And it had to be stuffed into EX 219 which meant virtual dismantling and rebuilding in *one* night. So it was ordered and so it was done. It was done by a crew of the hardest working mechanics one could ask to see and it was done by morning.

At noon all hands assembled on the salt. Hounslow fired up the car and started out on a warm-up run, followed by a fragrant aroma of nitrobenzene. In a few minutes he was back in the pit shed. The "hard" racing plugs were installed and Gus Ehrman who was to make the hour-long run got in for a full-bore check ride. No sweat here — just take it around and see what she'll do.

The little engine fired up with an ear-cracking blast and Gus shot out of the shed, tires churning up a spray of salt. Then it happened.

The sound of the engine rose sharply then fell off. Then it rose sharply again, much too quickly for normally expected acceleration. Gus turned the car around and headed back. He pulled in and lifted the canopy.

"It's the clutch," he said. "It won't hold anything over four thousand revs."

Buttoned snugly into the tight shell, the clutch and its linkage could not be seen — only felt by groping fingers. This one Hounslow worked on himself. There was only one thing to do. By feel and touch alone they must undo the linkage and try the car out in one gear. For an hour busy, skilled fingers groped until the slave cylinder was disconnected from the linkage and the clutch plates were as free to hold as they would ever be. Hounslow jumped in the car and twenty eager pair of hands pushed him off in third gear. The sputtering turned into a mutter then to a rumble which rose to a clear buzz as the car disappeared around the circle. All the way around this time.

Soon he was back. "Looks like linkage all right — try it in top gear, Gus."

Again a score of hands pushed hard and fast. Again the car muttered off into the glare. And again it made the distance.

"All right, now try three fast ones," Ehrman was told when he came around. Again he set off and when he came by he was storming, the car kicking up a light spray of salt the way only a car going 150 or more can do. The next lap was timed and the time was just over four minutes for 151 mph. It looked good until Gus pulled the car in at the end of the third lap.

"It's still no good," he said. "It comes undone at just over six thousand."

(Continued on Page 100)

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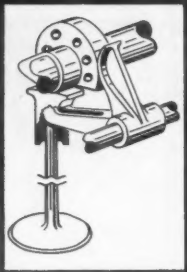
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## Eternity Begins at Dawn

from page 99

What to do? If you are Hounslow or Enever you make a tough decision. You pack up and go back to town for another all-night session. And this time you decide to test. You don't have any test equipment but you must test anyway. You scrounge around town until you find a 100-pound spring balance like the kind they used to weigh ice with. Then you weld a two-foot bar onto a splined socket that just fits the output shaft of the gearbox. You do this because you know that the engine puts out 86 lbs/ft of torque at 5800 rpm. You know that if you hooked the spring balance on the bar exactly two feet from the socket end and the socket end was attached to the mainshaft you should be able to pull at least 50 pounds on the scale without making the shaft turn. If it does the clutch is no good. If it doesn't you're in business. Meanwhile your mechanics undo the work they did the night before. And by 11 that night the engine is on the floor.

Four mechanics held the engine. Enever held the crank nose and Hounslow applied the scale and bar. It held at 40 on the scale—80 lbs/ft. At 45 it began to move and at 50 it slipped easily. It just wouldn't hold the torque. Period.

Now there was only one thing to do—remove and clean the clutch from the engine that had just gone full bore for 12 full hours, clean it up and try it with the bar and scale. Just to be sure, the flywheel and motor plate were removed from the 12-hour engine and installed on the sprint mill.

Again the bar was applied while willing hands held the engine. Hounslow heaved. The scale moved up—40, 45, 50, 60, 70, 80 pounds and still the clutch held. It was the equivalent of 160 lbs/ft of torque and 125 to 130 would do the trick.

On through the night they worked and at nine in the morning the job was done. Once more on the salt, Gus took off. Within a lap he was crackling along at 153 mph and giving the high-sign to the pit as he passed. Then he came in. His only complaint was that things seemed slicker than usual, a natural reaction since the car was now wearing Dunlop R5 tires that had been buffed down until only 2 millimeters of tread were left. These replaced the normal R5's worn earlier. The reason being, of course, to lighten the tread to make absolutely sure that it wouldn't separate from the carcass. But they were slippery.

The car was pushed back behind the timing lights and the engine lighted off. The flag fell and Gus was off in a smooth, clear rush. It was a good start—his standing lap was a nice healthy 134 mph. His second was 153 and his third was 152.5. The fourth lap took longer. Lots longer.

Captain Eyston brought the word. Gus had spun out, doing seven loops before pulling out of it. Morning dampness, slick salt and smooth tires had made 153 mph a shade too fast.

If you are Sid Enever or Alec Hounslow or Captain Eyston what do you do now? The average is down but is it down enough to pack it all up and start over? There is only one thing to do—sit tight and watch the clock to see if the average was above the record. It is, so you sit and wait while the minutes turn into the seeming hours they were on the long previous run. You sit and hold your breath for long moments at a time while your driver holds the car to what must be the barest ragged edge of adhesion. The minutes mush by and eventually all the intermediate marks have fallen except the 50 mile mark, missed on that horrendous spin. The one hour mark should be in the bag at something around 146 but anything can happen and it does.

Another spin, this time a vicious whip to the inside of the circle. Gus re-enters the circle half a mile down the course but the damage is done. It isn't time that's lost on this one—the average is still up above 145, some seven miles an hour above the existing record. The previous records are still held but you're dead for the one hour. Disqualified for leaving the course toward the inside and not re-entering it at the point it was left—an inadvertent short cut. It's heartbreaking but there's only one thing to do. You pat Gus on the back and break the news. He's got to do it again.

This time the car was equipped with the regular unbuffed R5's for a better bite at the salt. It was moved back to the line for a new chance—the third try for one seemingly measly hour when 12 had gone off without a hitch two days before. The flag fell and Gus was off—again.

And this time, if you're Eyston, Enever or Hounslow or any other man on the team, you really sweat. So far on this one Fate has dealt you every dirty hand in the book and you know very well there are a hundred things that can blackball you once again. So if you're Hounslow you gnaw at what nails are left from the other day. If you're Enever you pace and fidget. If you are the tall, gracious graying man named Eyston you sit and stare at the timer. And if you are Gus Ehrman you bore 'round and 'round bending every effort to stay on the course and maintain just the 147 miles an hour you've been told to make. With the new tires it feels much more secure, especially since now it is past noon and the hungry sun has sucked up much of the moisture that plagued you earlier. It's easy to exceed the limit and unconsciously you do. You and all your team mates also know that this is not the twelve-hour engine. It's a nitrated, overstressed, 99 horsepower mite that was built to make one run for the hour and a sprint up and down the straight. Will it last the distance after all this?

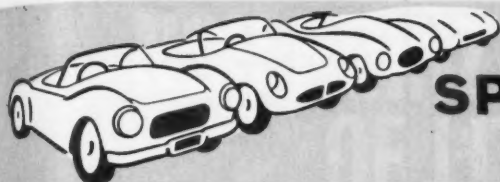
It would and it did. Without a single hitch and without missing a beat it picked off the hour record and five intermediate marks, raising them by three to six miles an hour each.

John Thornely, General Manager of MG and head of the company that built EX 219 put it best. "We're all tidy now," he said.

At least until some other dawn.

—jc





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Special

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were used, each roll being cut into three 3-inch sections. The awaiting wire mesh was coated with waterproof glue and the tedious job of laying the 3-inch strips of paper towel, layer after layer, began. Labor was one of the commodities readily available and the body was completed in a few days. Ten layers were applied to the exterior and four layers to the interior. Once completely dried, the 14 layers of heavy paper towel made up a body shell that resisted collisions with hay bales better than its aluminum and fiberglass counterparts. The hood was salvaged from the same Crosley Supersport that had contributed the engine, and the swing-down doors were formed from sheet aluminum. White rubberized paint, the type used in cellars of homes, was applied to the dried paper as another precaution against damage from water. A coating of wax, and the Papier Mache Special was ready for Cumberland. Total weight came to 900 pounds, 500 pounds forward and the remainder rear. Frontal area worked out to a mere 7½ square feet.

Christened the FCA MK I, in honor of the youthful builders, the Future Craftsmen of America, the car was driven to the Cumberland Nationals for its racing debut. After a superb performance in the H Modified race, the car was forced into the pits due to mechanical trouble in the form of an overheated coil. Although only running two-thirds of the race, the car received enthusiastic compliments on its handling qualities from driver Ross Wees. The next test came at the Giant's Despair Hill Climb. The combination of light weight and excellent design proved itself, resulting in the FCA MK I placing second in its class. At Berwick, Pa., the Papier Mache Special was leading the pack until the coil gave up just two laps from the checkered flag. Akron was the true test of the feasibility of using paper to fabricate a sports car body. A continual downpour greeted the drivers and cars at the starting grid. The beating rain had no effect on the waterproofed-paper body shell. A collision with a hay bale lining the chicane once again proved the durability of the body. Not so much as a scratch was detected as a result of the encounter. A Lotus, hitting the same bale at relatively the same speed, ended up with a caved-in fender.

Mechanical setbacks were disappointing, but the superiority of the body design and suspension proved to the builders that for a total of only \$325, they could construct a car that would hold its own with factory machinery. Future plans include the installation of a modified Saab engine to replace the stock Crosley, a change which should reveal the true potential of the car. A second car, the FCA MK II, is under construction and the knowledge acquired in building the prototype is being incorporated in the new special. Further weight reduction is being sought by more extensive use of aluminum and by using ¾-inch tubing for the frame.

—gl

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